The PHOTOFACT Servicer

SET 423 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ DEC. 1, 1958

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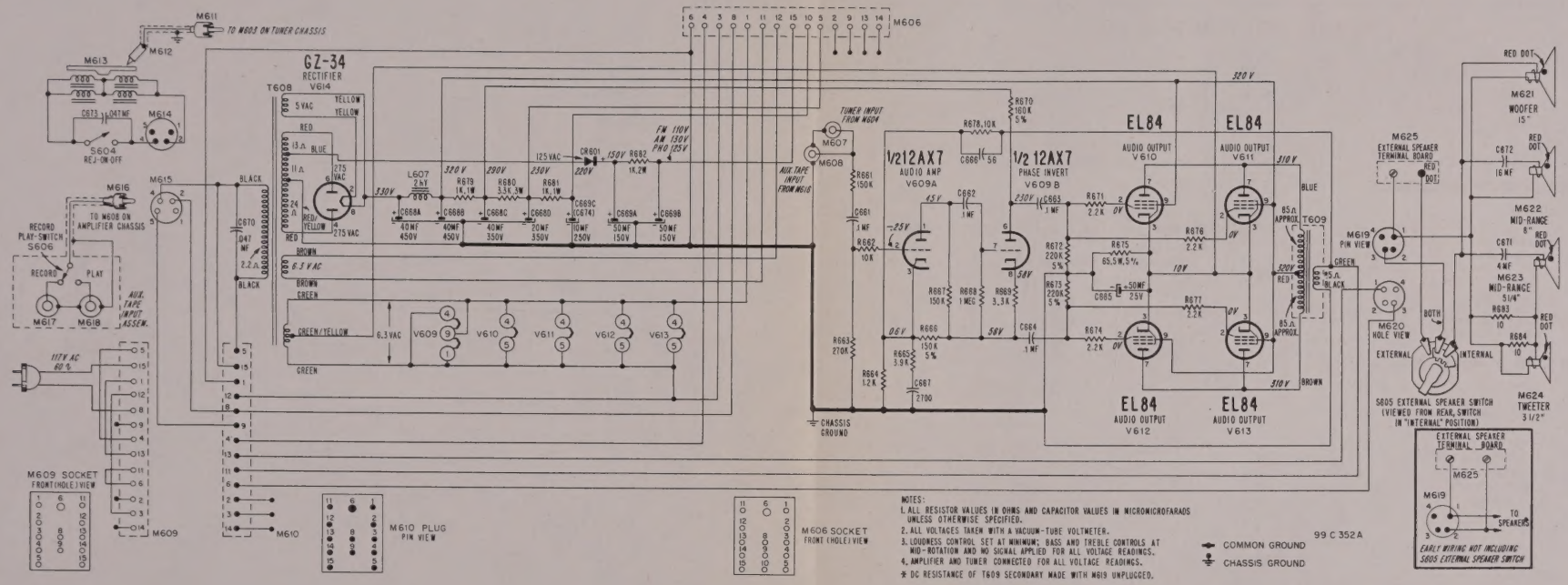
The service information in this Servicer provides data on models which we have been unable to present in PHOTOFACT Folders. The receivers are not in current production; a requirement for PHOTOFACT coverage, and we are therefore presenting schematics and supplementary data that will be of assistance when servicing these models.



ADMIRAL AMPLIFIER CHASSIS 6D3

SCHEMATIC DIAGRAM COURTESY ADMIRAL CORP.

SCHEMATIC DIAGRAM COURTESY ZENITH RADIO CORP.

ZENITH MODEL H725Z1 CHASSIS 7G01Z1

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

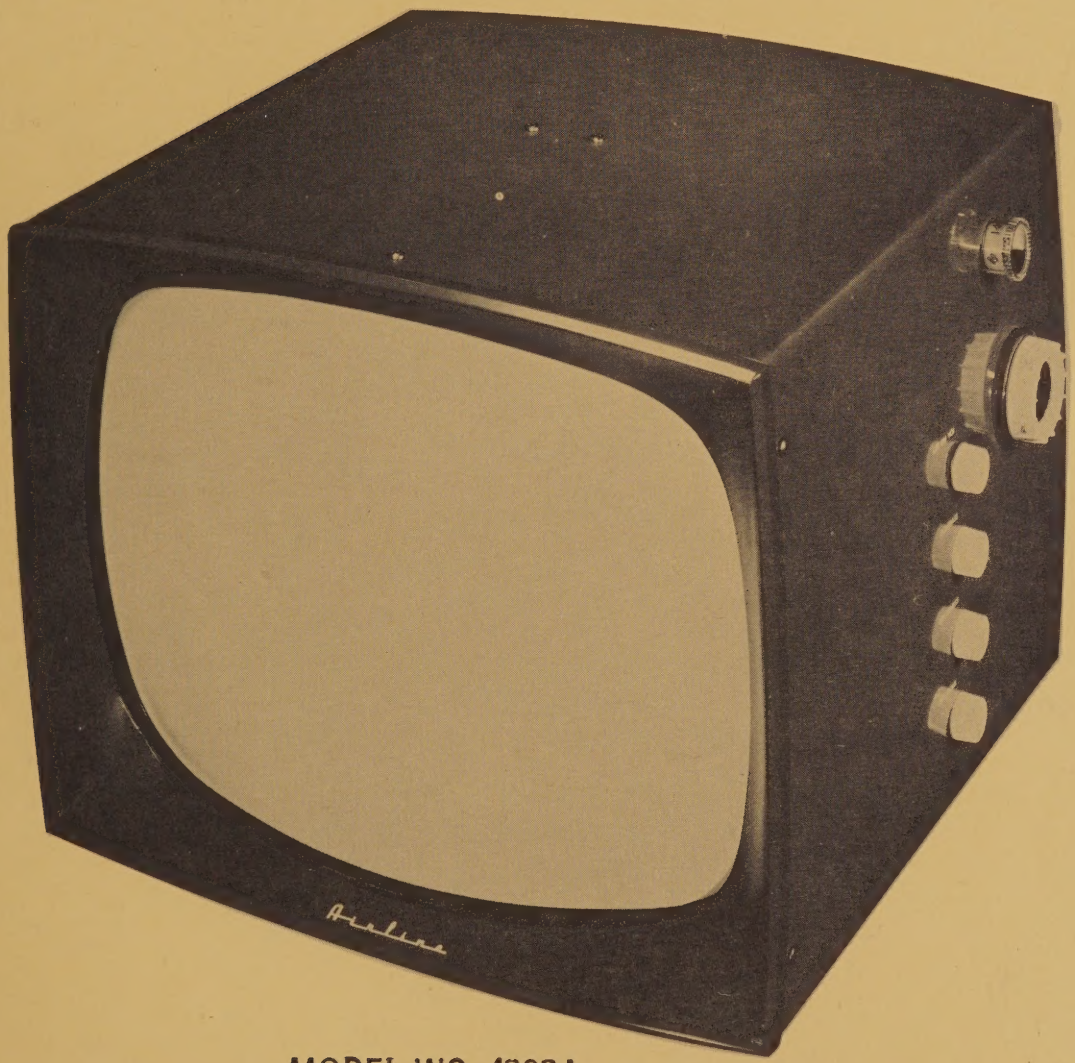
AIRLINE MODELS
WG-4203A, WG-4303A

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

AIRLINE MODELS
WG-4203A, WG-4303A



MODEL WG-4303A

AIRLINE MODELS
WG-4203A, WG-4303A

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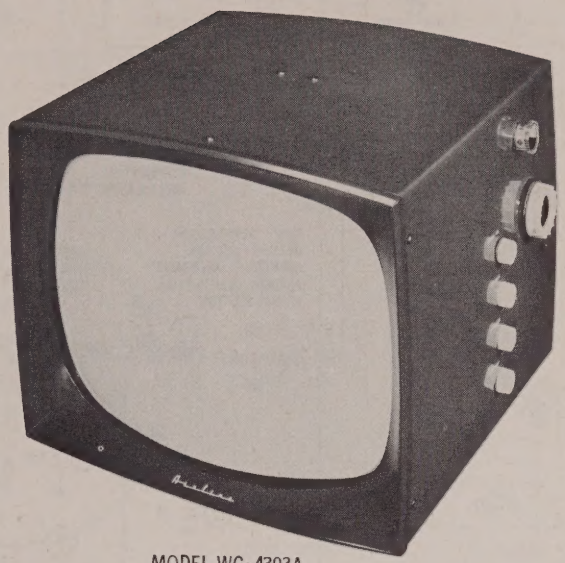
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana . Printed in U.S. of America

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 8 push on type knobs from the side.
2. Remove 5 metal screws holding rear cover. Remove rear cover.
3. Remove picture tube socket, yoke plug, and speaker leads.
4. Remove 2 bottom metal screws holding safety interlock bracket.
5. Remove 2 hex nuts holding speaker to cabinet. Remove the speaker.
6. Remove 2 metal screws holding the top chassis support bracket.
7. Remove 2 bottom chassis bolts.
8. Remove ground lead to picture tube mounting bracket.
9. Partially remove chassis from rear. Remove HV lead. Remove chassis.



MODEL WG-4303A

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

TRADE NAME	Airline MODELS WG-4203A, WG-4303A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Avenue, Chicago, Illinois
TYPE SET	Television Receiver
TUBES	Fourteen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 115 Watts, 1.17 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

AIRLINE MODELS
WG-4203A, WG-4303A

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the rear cover, and supplying power to the receiver. Set the Fine Tuning at the center of its range. The adjustments are accessible, one at a time, thru a hole in the right side of the tuner rear cover as viewed from the rear. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube, and safety glass cleaning, it is necessary to remove the chassis. (See disassembly instructions.)

FOCUS

The focus may be varied by the position of a strap on the base of the Picture Tube. The strap can be connected between pins 6 and 10 or 6 and 2.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

For adjustment of the Horizontal Multivibrator, it is necessary to remove the rear cover and supply power to set. Set the Horizontal Hold at the center of its range and adjust the Horizontal Frequency slug (B1) until the picture synchronizes horizontally. (For location, see tube placement chart.)

FUSE DEVICE

A 4.7Ω fusible resistor (R59) is used for low voltage power supply protection. For location, see tube placement chart.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

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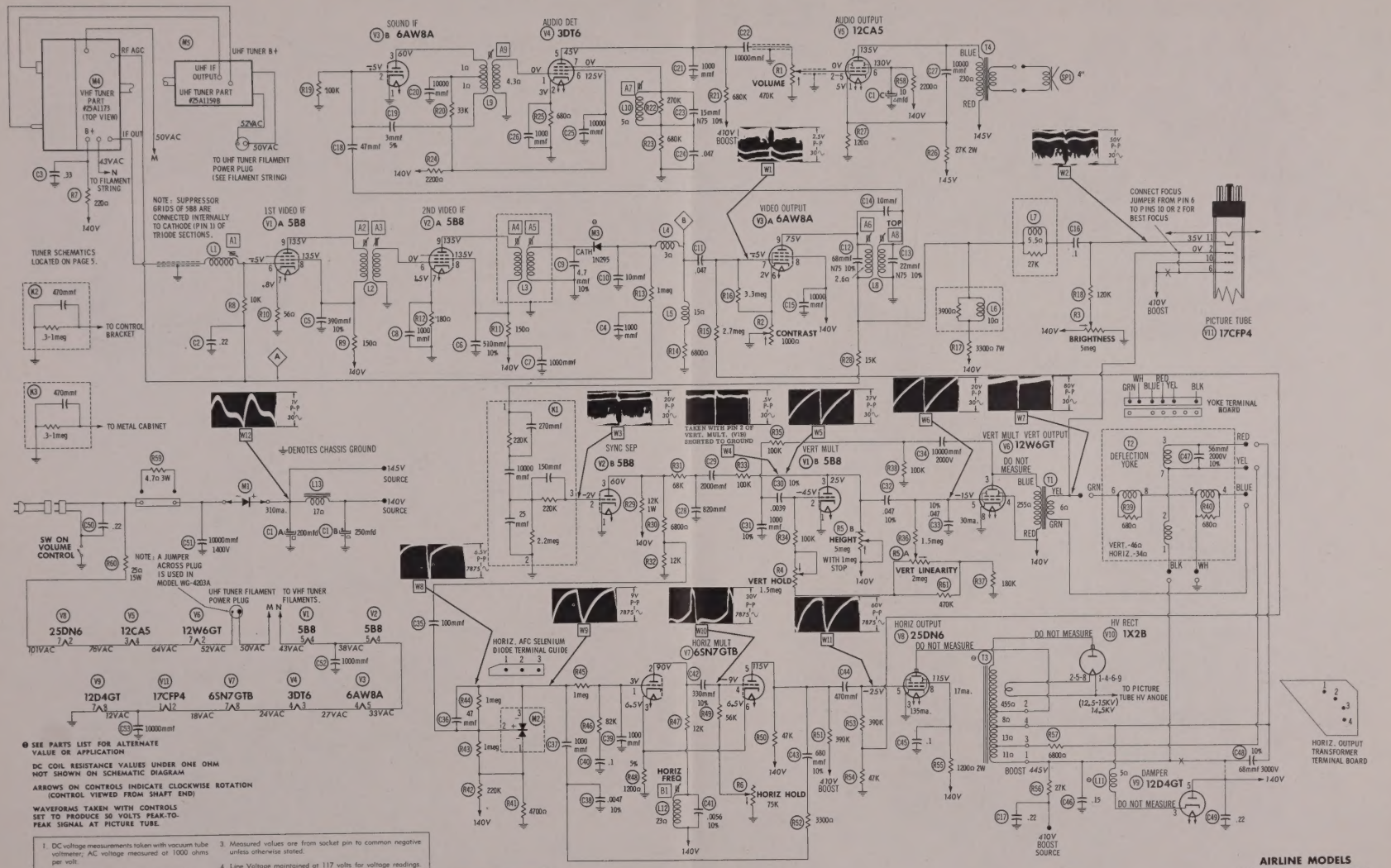
SOUND IF V3 B 6AW8A
AUDIO DET V4 3DT6
AUDIO OUTPUT V5 12CA5
VIDEO OUTPUT V3 A 6AW8A
1ST VIDEO IF V1 A 5B8
2ND VIDEO IF V2 A 5B8
VERT MULT V1 B 5B8
SYNC SEP V2 B 5B8
VERT MULT VERT OUTPUT V6 12W6GT
HORIZ MULT V7 6SN7GTB
HORIZ OUTPUT V8 25DN6
HV RECT V10 1X2B
DAMPER V9 12D4GT
PICTURE TUBE V11 17CFP4
VHF TUNER PART #DA1173 (TOP VIEW)
UHF TUNER PART #DA1598
TUNER SCHEMATICS LOCATED ON PAGE 5.
NOTE: SUPPRESSOR GRIDS OF 5B8 ARE CONNECTED INTERNALLY TO CATHODE (PIN 1) OF TRIODE SECTIONS.
VOLUME 470K
CONTRAST 1000Ω
BRIGHTNESS 5meg
HEIGHT 5meg WITH 1meg STOP
VERT HOLD 1.5meg
VERT LINEARITY 2meg
HORIZ HOLD 75K
HORIZ FREQ
CONNECT FOCUS JUMPER FROM PIN 6 TO PINS 10 OR 2 FOR BEST FOCUS
410V BOOST
BOOST 445V
DO NOT MEASURE
TO PICTURE TUBE HV ANODE (12.5-15KV) 14.5KV
YOKE TERMINAL BOARD
DEFLECTION YOKE
VERT.-46Ω HORIZ.-34Ω
HORIZ. OUTPUT TRANSFORMER TERMINAL BOARD
TO CONTROL BRACKET
TO METAL CABINET
SW ON VOLUME CONTROL
NOTE: A JUMPER ACROSS PLUG IS USED IN MODEL WG-4203A
UHF TUNER FILAMENT POWER PLUG
TO VHF TUNER FILAMENTS.
TO UHF TUNER FILAMENT POWER PLUG (SEE FILAMENT STRING)
TO FILAMENT STRING
145V SOURCE
140V SOURCE
410V BOOST SOURCE
DENOTES CHASSIS GROUND
HORIZ. AFC SELENIUM DIODE TERMINAL GUIDE
TAKEN WITH PIN 2 OF VERT. MULT. (V1B) SHORTED TO GROUND
25DN6 7A2 101VAC
12CA5 3A1 76VAC
12W6GT 7A2 64VAC
5B8 5A4 52VAC
5B8 5A4 30VAC
5B8 5A4 43VAC
5B8 5A4 38VAC
12D4GT 7A8 12VAC
17CFP4 1AV2 18VAC
6SN7GTB 7A8 24VAC
3DT6 6A3 27VAC
6AW8A 4A5 33VAC
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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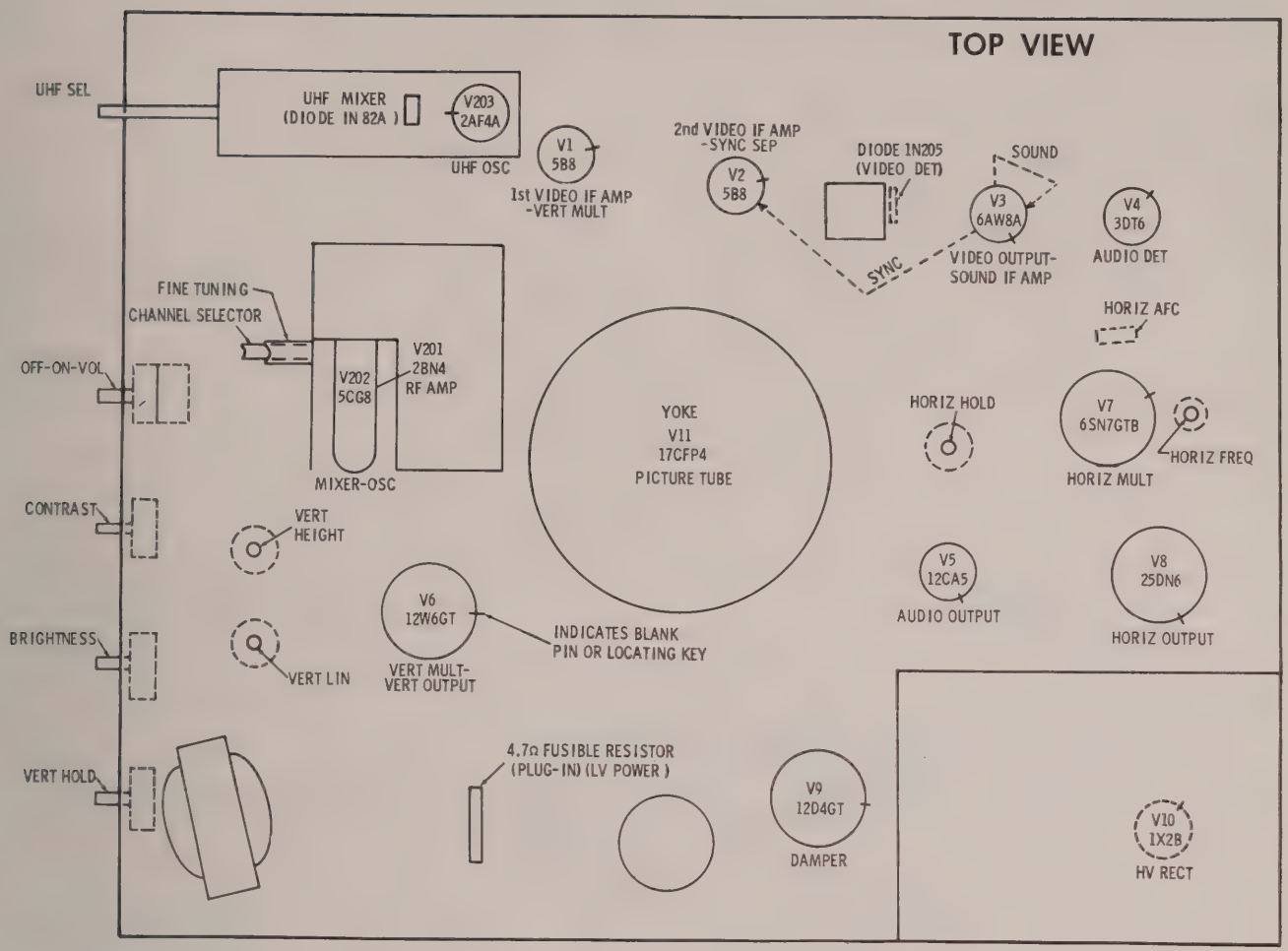
AIRLINE MODELS
WG-4203A, WG-4303A

TUBE PLACEMENT CHART



AIRLINE MODELS
WG-4203A, WG-4303A

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

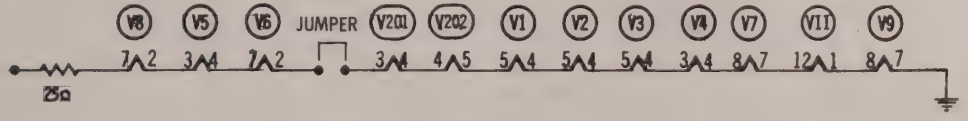
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor (R59), Rectifier (M1)

SWEEP FAILURE
No raster, has sound Rectifier (M2), V7, V8, V9, V10, V11
No vertical deflection V1, V6
Poor vert. linearity or foldover V1, V6
Poor horiz. linearity or foldover V7, V8, V9
Narrow picture V7, V8, V9, M1
Vert. off freq. V1, V6
Horiz. off freq. V7

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, Diode (M3), V3
No pic, no sound, has snow V201, V202 (V203 UHF only)
No pic, has sound, has raster V3, V11
Has pic, no sound V3, V4, V5

SYNC FAILURE
No vert. sync V2
No horiz. sync V2, M2
No vert. or horiz. sync V2

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



FOLDER 1

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools ..... General Cement #8282, 8606, 8606L or 9295
Walsco #2543, 2544, or 2545

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
Disable the tuner oscillator by replacing the oscillator tube (V202) with one having the oscillator grid pin removed.
Short the antenna terminals together but not to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over mixer-osc. tube (V202). Low side to chassis.	44.0MC (10MC Swp)	42.75MC 45.75MC	Any non-interfering channel	Vert. Amp. thru detector (Fig.1) to pin 9 (plate) of 5B8 (V1). Low side to chassis.	Mixer Plate Coil & A1	Adjust for maximum gain and symmetry of response similar to Fig. 2 with markers as shown.
2.	1000mmf Ceramic Capacitor	High side to pin 6 (grid) of 5B8 (V1). Low side to chassis.	"	"	"	Vert. Amp. thru detector (Fig. 1) to pin 9 (plate) of 5B8 (V2). Low side to chassis.	A2, A3	"
3.	"	High side to pin 6 (grid) of 5B8 (V2). Low side to chassis.	"	"	"	Vert. Amp. thru 10K to point (B). Low side to chassis. (Across video det. load).	A4, A5	"
4.	Direct	High side to ungrounded tube shield floating over mixer-osc. tube (V202). Low side to chassis.	"	"	"	"		Retouch Mixer Plate Coil and A1 thru A5 as required for response similar to Fig. 3. Remove bias and replace V202 in its socket.

SOUND IF ALIGNMENT

Set the contrast control fully clockwise.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	1000mmf Ceramic Capacitor	High side to point (B). Low side to chassis.	Not used	4.5MC (400∿ 30% AM)	Any non-interfering channel	Vert. Amp. thru detector (Fig. 4) to pin 11 (cathode) of picture tube. Low side to chassis.	A6	Turn A6 and A8 almost out of coil forms. Then adjust A8 for MINIMUM scope indication.
6.	"	"	4.5MC (15KC Swp)	Not used	"	Across speaker voice coil	A7, A8, A9	Use only enough sweep generator output to provide a usable pattern on scope. Turn A7 fully clockwise, then counter clockwise for maximum scope indication. Adjust A8 and A9 for maximum scope indication. Remove test equipment and tune in a local TV station. Retouch A7 for MINIMUM buzz.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 6.

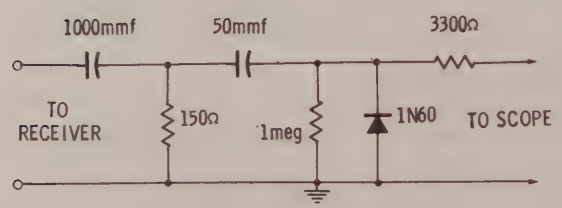


FIG. 1

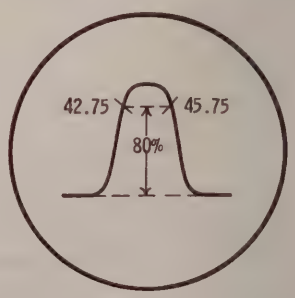


FIG. 2

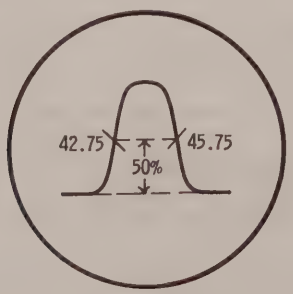


FIG. 3

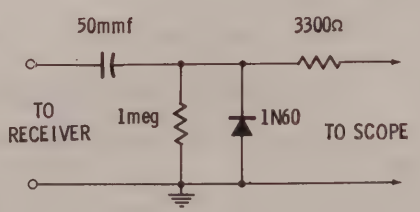
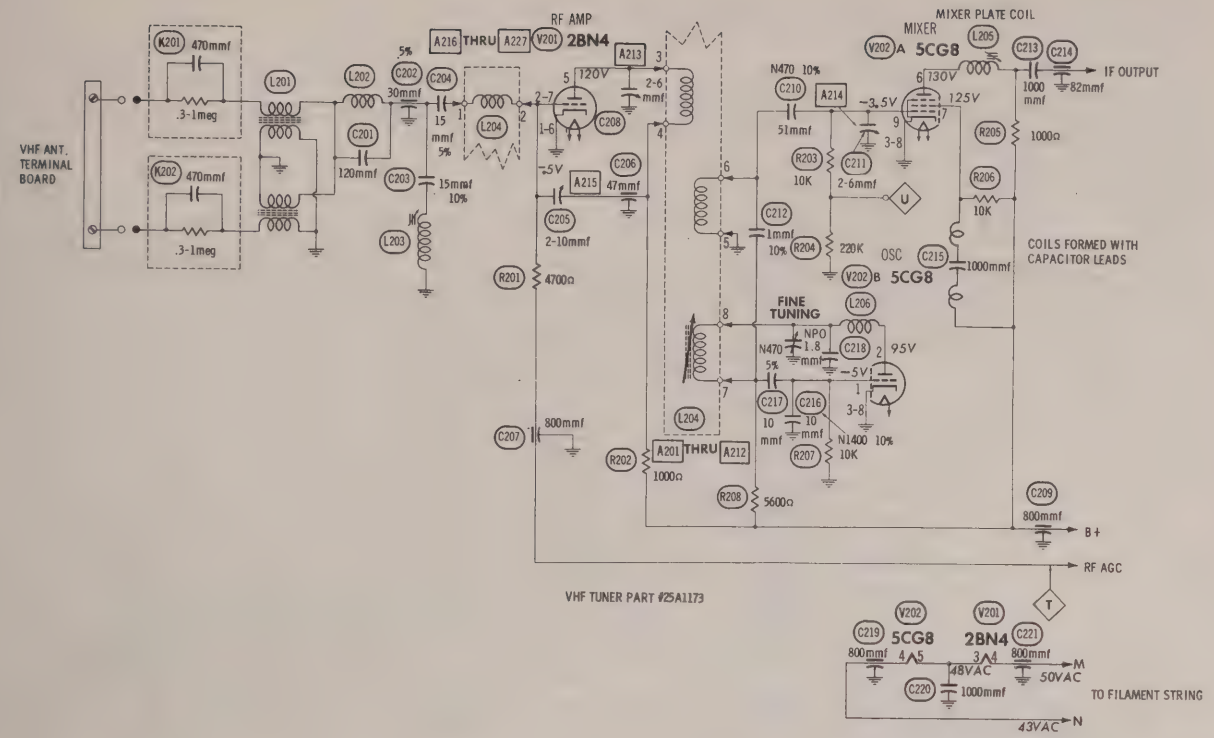


FIG. 4



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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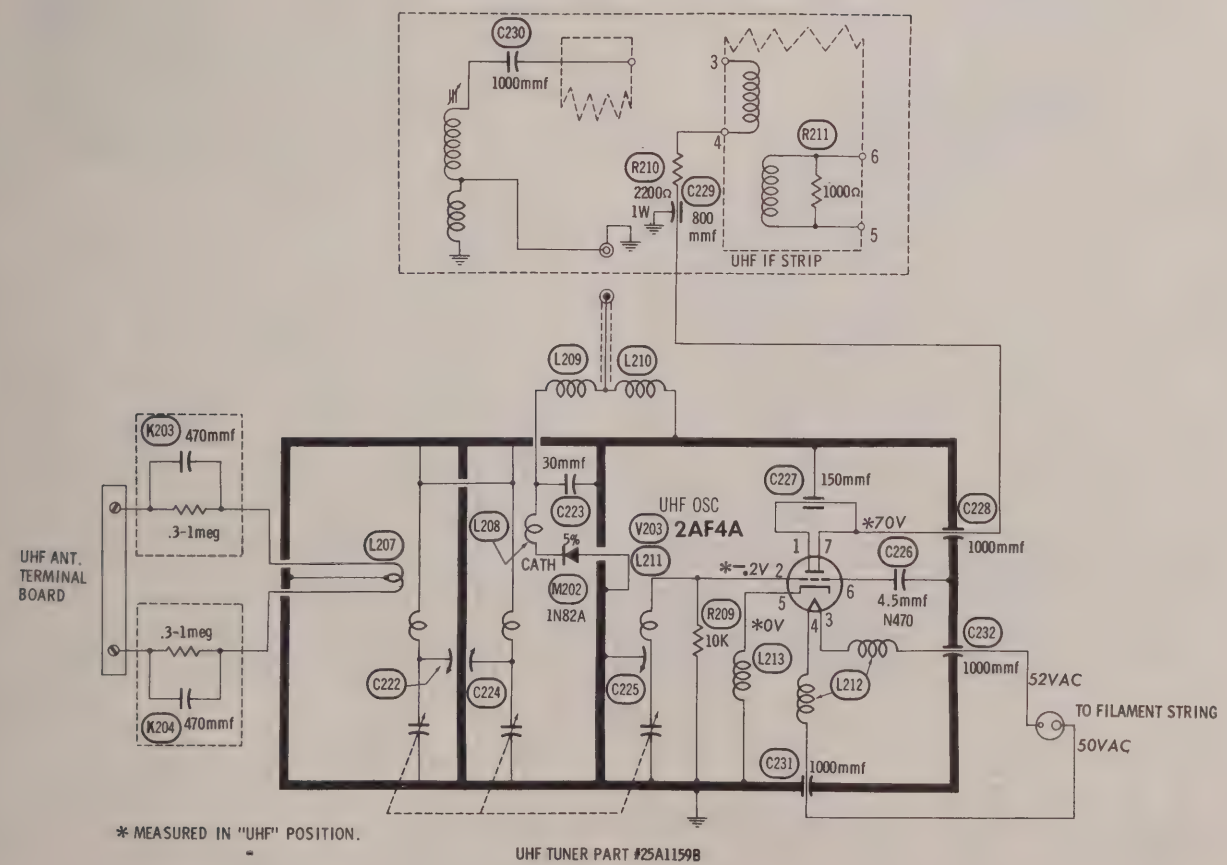
VHF TUNER 25A1173



* MEASURED IN "UHF" POSITION.

UHF TUNER PART #25A1159B

REAR COVER 25A1164 & UHF TUNER 25A1159

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLATOR ALIGNMENT

Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across video detector load.	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A202	
			201MC	199.25MC 203.75MC	11		A203	
			195MC	193.25MC 197.75MC	10		A204	
			189MC	187.25MC 191.75MC	9		A205	
			183MC	181.25MC 185.75MC	8		A206	
			177MC	175.25MC 179.75MC	7		A207	
			85MC	83.25MC 87.75MC	6		A208	
			79MC	77.25MC 81.75MC	5		A209	
			69MC	67.25MC 71.75MC	4		A210	
			63MC	61.25MC 65.75MC	3		A211	
			57MC	55.25MC 59.75MC	2		A212	

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 2.5 volt bias supply to point Ⓣ . Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point Ⓣ . Low side to chassis.	A213, A214	Adjust A213 and A214 for maximum amplitude and symmetry with markers as shown in Fig. 202.
3.	"	"	"	"	"	Vert. Amp. thru detector (Fig. 203) to plate of 1st. video IF tube. Low side to chassis.	A215	Reduce bias to -1.5 volts. Adjust for MINIMUM response.
4.	"	"	213MC	211.25MC 215.75MC	13	"	A216	Adjust for maximum amplitude of response similar to Fig. 202. Adjust by expanding or compressing coil turns.
			207MC	205.25MC 209.75MC	12		A217	
			201MC	199.25MC 203.75MC	11		A218	
			195MC	193.25MC 197.75MC	10		A219	
			189MC	187.25MC 191.75MC	9		A220	
			183MC	181.25MC 185.75MC	8		A221	
			177MC	175.25MC 179.75MC	7		A222	
			85MC	83.25MC 87.75MC	6		A223	
			79MC	77.25MC 81.75MC	5		A224	
			69MC	67.25MC 71.75MC	4		A225	
			63MC	61.25MC 65.75MC	3		A226	
			57MC	55.25MC 59.75MC	2		A227	

ANTENNA TRAP ALIGNMENT

Some types of interference can be reduced by adjusting A228. Observe the picture and adjust A228 for MINIMUM interference.

UHF ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

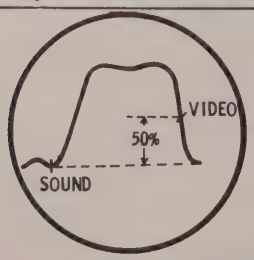


FIG. 201

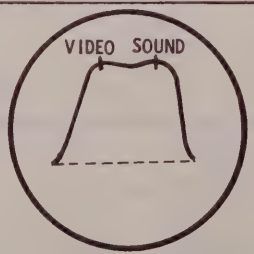


FIG. 202

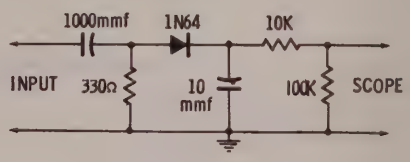
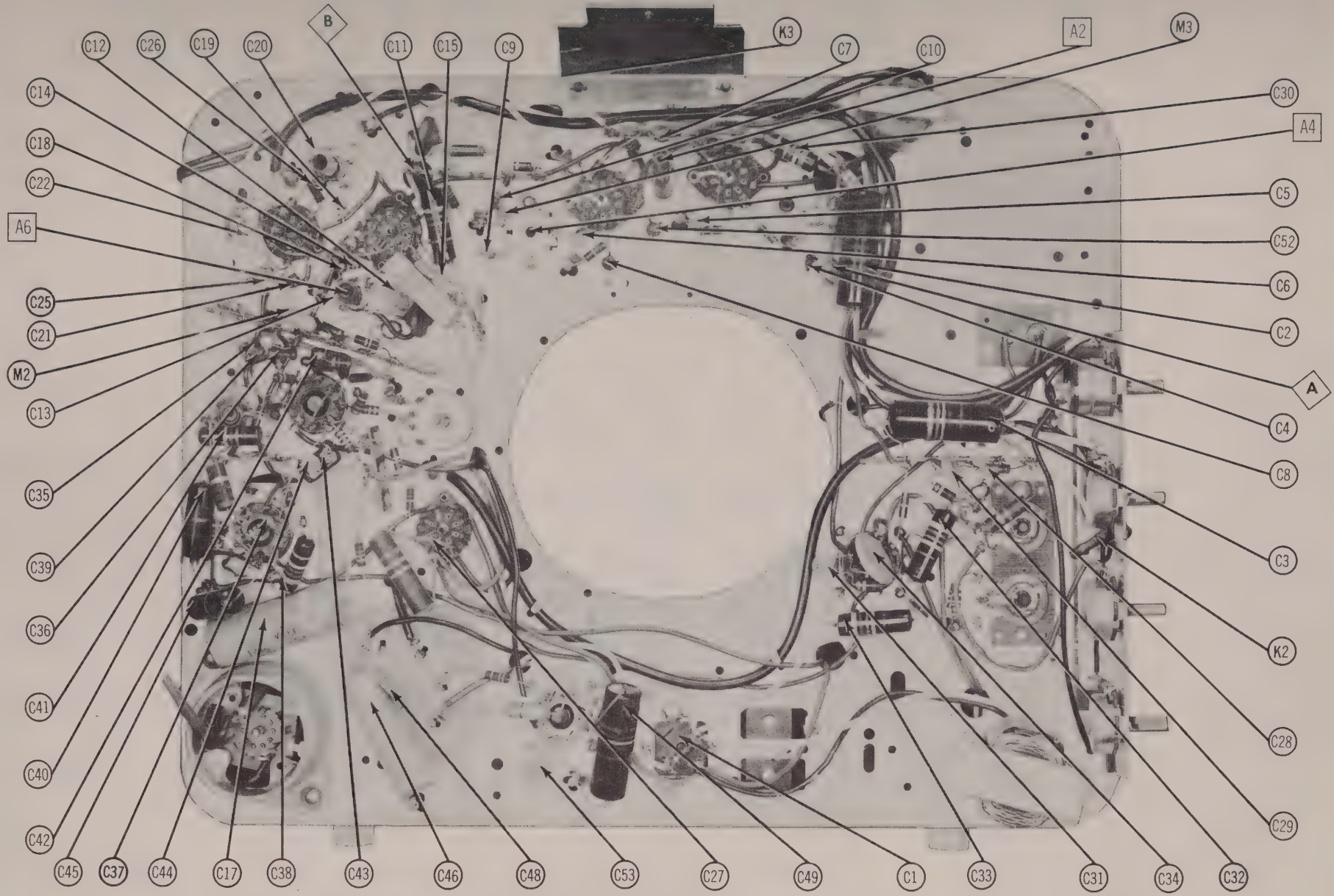


FIG. 203



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp - Vert Multi.	5B8	
V2	2nd Video IF Amp. - Sync Sep	5B8	
V3	Video Output-Sound IF Amp	6AW8A	
V4	Audio Det	3DT6	
V5	Audio Output	12CA5	
V6	Vert. Mult. -Vert. Output	12AW6GT	
V7	Horiz. Mult.	6SN7GTB	
V8	Horiz. Output	25DN6	
V9	Damper	12DM6GT	
V10	HV Rectifier	1X2B	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	AIRLINE PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No.	
V11	17CFP4			17CFP4 ①	① "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP	VOLT	AIRLINE PART No	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	●200	200	45X445	AFH3-13-90	XCQ139	FP318.8			TVLS-3455
B	▲250	200							
C	40	200							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	AIRLINE PART No	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.		
C2	.22	200		P288N-22		CUB2P22	GEM-2022	2TM-P22		
C3	.33	200	RCP10M3334M	P288N-33		PM4P33	GEM-2033			
C4	1000			BPD-001	DD-102	BYA5DI	B-IIO	5HK-DI		
C5	390				MD-391	UD739				10%
C6	510				MD-511					10%
C7	1000			BPD-001	DD-102	BYA5DI	B-IIO	5HK-DI		
C8	1000			BPD-001	DD-102	BYA5DI	B-IIO	5HK-DI		
C9	4.7			NPO-4R7	TCZ-4R7	CTA5V47C	ZT-5547	5TCCB-V47		10%
C10	10			5K 10	D5-100	LT5Q1	UC-541	5GA-Q1		
C11	.047	300		P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47		
C12	68									NTS 10%
C13	33									NTS 10%
C14	10			5K 10	D5-100	LT5Q1	UC-541	5GA-Q1		
C15	10000			BPD-01	DD-103	BYA10B	B-110	5HK-SI		
C16	.1	300		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1		
C17	.22	600		P468N-22		CUB6P22	GEM-6022	6TM-P22		
C18	47			5K 47	D5-470	LT5Q47	UC-5447	5GA-Q47		
C19	3									5%
C20	10000			BPD-01	DD-103	BYA10SI	B-110	5HK-SI		
C21	1000			BPD-001	DD-103	BYA5DI	B-IIO	5HK-DI		
C22	10000			BPD-01	DD-103	BYA10SI	B-110	5HK-SI		
C23	15									NTS 10%
C24	.047	300		P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47		
C25	10000			BPD-01	DD-103	BYA10SI	B-110	5HK-SI		
C26	1000			BPD-001	DD-103	BYA5DI	B-IIO	5HK-DI		
C27	10000		80X30	BPD-01	DD-103	BYA10SI	B-110	5HK-SI		
C28	820				DD-821	L10T82	B-382	5GA-T82		
C29	3000			BPD-002	DD-302	BYA10D2	B-330	5HK-D2		
C30	.0039	400						5BF-D39		10%
C31	1000						JL-310			10%
C32	.047	300						2WF-S47		10%
C33	.047	300						2WF-S47		10%
C34	10000	3000	47X784					2HV-110		
C35	100			5K 100	D5-101	LT5T1	UC-531	5GA-T1		
C36	47			5K 47	D5-470	LT5Q47	UC-5447	5GA-Q47		
C37	1000			BPD-001	DD-103	BYA5DI	B-IIO	5HK-DI		
C38	.0047	400						GEM-16547		10%
C39	1000			BPD-001	DD-103	BYA5DI	B-IIO	5HK-DI		
C40	.1	300		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1		
C41	.0056	400					GEM-16256	5BF-D56		10%
C42	330		47X765	1468-00033	MD-331	SR5T33		MS-333		10%
C43	680			1459-00068	MD-681	LR5T68		MS-368		10%
C44	470			BPD-00047	DD-471	L10T47	B-347	5GA-T47		
C45	.1	300		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1		
C46	.15	600		P468N-15		PM6P15	GEM-6015	6TM-P15		
C47	56	3000				HVA30Q56	3DY-456	3GA-Q56		10%
C48	68	3000	47X763				3DY-468	3GA-Q68		10%
C49	.22	200		P288N-22		CUB2P22	GEM-2022	2TM-P22		
C50	.22	400		P488N-22		CUB4P22	GEM-4022	4TM-P22		
C51	10000	1400	47X615							
C52	1000			BPD-001	DD-103	BYA5DI	B-IIO	5HK-DI		
C53	10000			BPD-01	DD-103	BYA10SI	B-110	5HK-SI		

CONTROLS

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	470K	½	40X444	B-60	A47-500K-2	QI3-133	TA5SA	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWR-12	76-1	US-26	
R2	1000Ω	½	40X439	B-505		QI7-108	U3	Contrast
R3A	5meg	½	40X440	B-57	A47-5meg-S	QI1-141	TA56L	Brightness
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	1.5meg	½	40X441	B-742	A47-1.5meg-S	QI1-138	TA15SL	Vert. Hold
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	2meg	½	40X443	AB-75	B47-2meg-S	QI1-139	PTA25L	Vert. Lin.
B	Shaft			AK-19	Not Req.	Not Req.	Not Req.	
C	5meg	½		AB-87 †	B47-5meg-S†	QI1-141 †	PTA56L †	Height with 1meg stop
D	Shaft			AK-19	Not Req.	Not Req.	Not Req.	
R6A	75K	½	40X442	AB-35	B47-100K-S	QI1-128	PTA15L	Horiz. Hold
B	Shaft			AK-19	Not Req.	TQ	Not Req.	

* Use KR with CRL "red label" controls and KB with "blue label" controls.
† Use a 1meg resistor in series with the right hand terminal of control viewed from front with terminal down.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		AIRLINE PART No.	NOTES
	OHMS	WATT		
R7	220Ω			
R8	10K			
R9	150Ω			
R10	56Ω			
R11	150Ω			
R12	180Ω			
R13	1meg			
R14	6800Ω			
R15	2.7meg			
R16	3.3meg			
R17	3300Ω	7	43X393	
R18	120K			
R19	100K			
R20	33K			
R21	680K			
R22	270K			
R23	680K			
R24	2200Ω			
R25	680Ω			
R26	27K	2		
R27	130Ω			
R28	15K			
R29	12K	1		
R30	6800Ω			
R31	68K			
R32	12K			
R33	100K			
R34	100K			

ITEM No.	RATING		AIRLINE PART No.	NOTES
	OHMS	WATT		
R35	100K			
R36	1.5meg			
R37	180K			
R38	100K			
R39	680Ω			
R40	680Ω			
R41	4700Ω			
R42	220K			
R43	1meg			
R44	1meg			
R45	1meg			
R46	82K			
R47	12K			
R48	1200Ω 5%			
R49	56K			
R50	47K			
R51	390K			
R52	3300Ω			
R53	390K			
R54	47K			
R55	1200Ω	2		
R56	27K			
R57	6800Ω			
R58	2200Ω			
R59	4.7Ω	3	43X394	
R60	25Ω	15	43X392	
R61	470K			

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		AIRLINE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.		
L1	1st. Video IF	9A2427		TV-131		VF-4		
L2	2nd. Video IF	9A2390						
L3	3rd. Video IF	9A2426						
L4	Resonant Choke	9A2431						17 Microhenries
L5	Shunt Peaking Coil	36A47	19-4980	TV-207	6156			980 Microhenries
L6	Shunt Peaking Coil	36A46	19-4400 *	TV-201 *	6154 *	VP-7 *		385 Microhenries, wound on 3900Ω resistor
L7	Series Peaking Coil	36A48	19-3160 ▲	TV-196 ▲	6120 ▲	VP-5 ▲		161 Microhenries, wound on 27K resistor
L8A	1st. Sound IF	9A2425		TV-120				
B	4.5MC Trap							
L9	2nd. Sound IF	9A2429						
L10	Quadrature Coil	9A2426	20-1007 ▲	TV-121 ■				
L11	RF Choke	9A2432						7.5 Microhenries ①

* Parallel with 3900Ω resistor.
▲ Parallel with 27K resistor.
■ Drill new mounting hole.
① IRC Part #C1A.
■ Includes Cap.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	AIRLINE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	
L12	23Ω		9A2430	19-1578 ▲	TV-185 *	6110	H-102	HS-7	▲ Enlarge mounting hole. * Disregard tap.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA							
	CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT 1000 ~/s	AIRLINE PART No	Halldorson PART No	Merit PART No	Ram PART No	Stancor PART No.	Thordarson PART No	Triad PART No
L13	.260A	17Ω	.4 Hy.	52X102			F-801 ①			C-27X

① Drill new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		AIRLINE PART No.	Halldorson PART No.	Merit PART No	Ram PART No.	Rogers PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	Vert. Output	51X193	21900 ①	A-2822 ②				26S75 ①	
T2	Yoke -Horiz. (25MH) (90°) -Vert. (38MH)	9A2423 ③	DF607 ④⑤	MDF-92 ④⑤	Y90F19/43 ④⑤		DY-16A ④⑤	Y-45 ④⑤	Y-45 & NW19 ④
	Rear Cover & Centering Device	2A489							YC-1 & CL-1
	Yoke Clamp	30X839							
T3	Horiz. Output	53X368E		X154 *			HO-397 *	FLY-146 *	D-124 *
	Alt. Horiz. Output	53X368							

① Use 6 : 1 turns ratio.
② Drill new mounting hole(s).
③ Includes R39, R40 and C47.
④ Connect same as original.
⑤ Use original rear cover and centering device. Use yoke damping network, if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	2				2	2	2	2
	4				4	4	4	4
	3				3	3	3	3
	1				1	1	1	1
Special Notes →					⑤	⑤		

⑤ Remove one turn from filament winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T4	4000Ω	3-4Ω	51X192	21107 ①	A-3036	AU-601 ①	A-3677 ①	24S48	S-5X	① Drill new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	12A560	4A05	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	AIRLINE PART No.	REPLACEMENT DATA	
K1	Sync Coupling	25mmf, 150mmf, 270mmf, 10000mmf, 2.2meg, 220K, 220K	76X14		
K2	Control Bracket Isolation	470mmf, .5-1meg	76X11	Centralab Sprague	RC-471 ACI-1
K3	Cabinet Isolation	470mmf, .5-1meg	76X11	Centralab Sprague	RC-471 ACI-1

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	AIRLINE PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.310A	66X19 ① 66X20 ②	HF804 HK615 ③	1N1006 ②	SD-94 ① SD-81 ① ③	M500 ①	① Silicon Type. ② Germanium Type. ③ Selenium Type. ④ Two used.
M2							

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		AIRLINE PART No.	CBS PART No.	SYLVANIA PART No	
M3	1N295 *	66X30	1N80	1N295	Video Detector (Pigtail) * Some versions may use CK-706A in this application.

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M4	Tuner	25A1173	VHF, Standard Coil Part #FNS-044
	Tuner Cover	25A1164	UHF Provision for above VHF Tuner (Standard Coil Part #FCN-011)
M5	Tuner	25A1159B	UHF, Standard Coil Part #NEUFS-103.

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

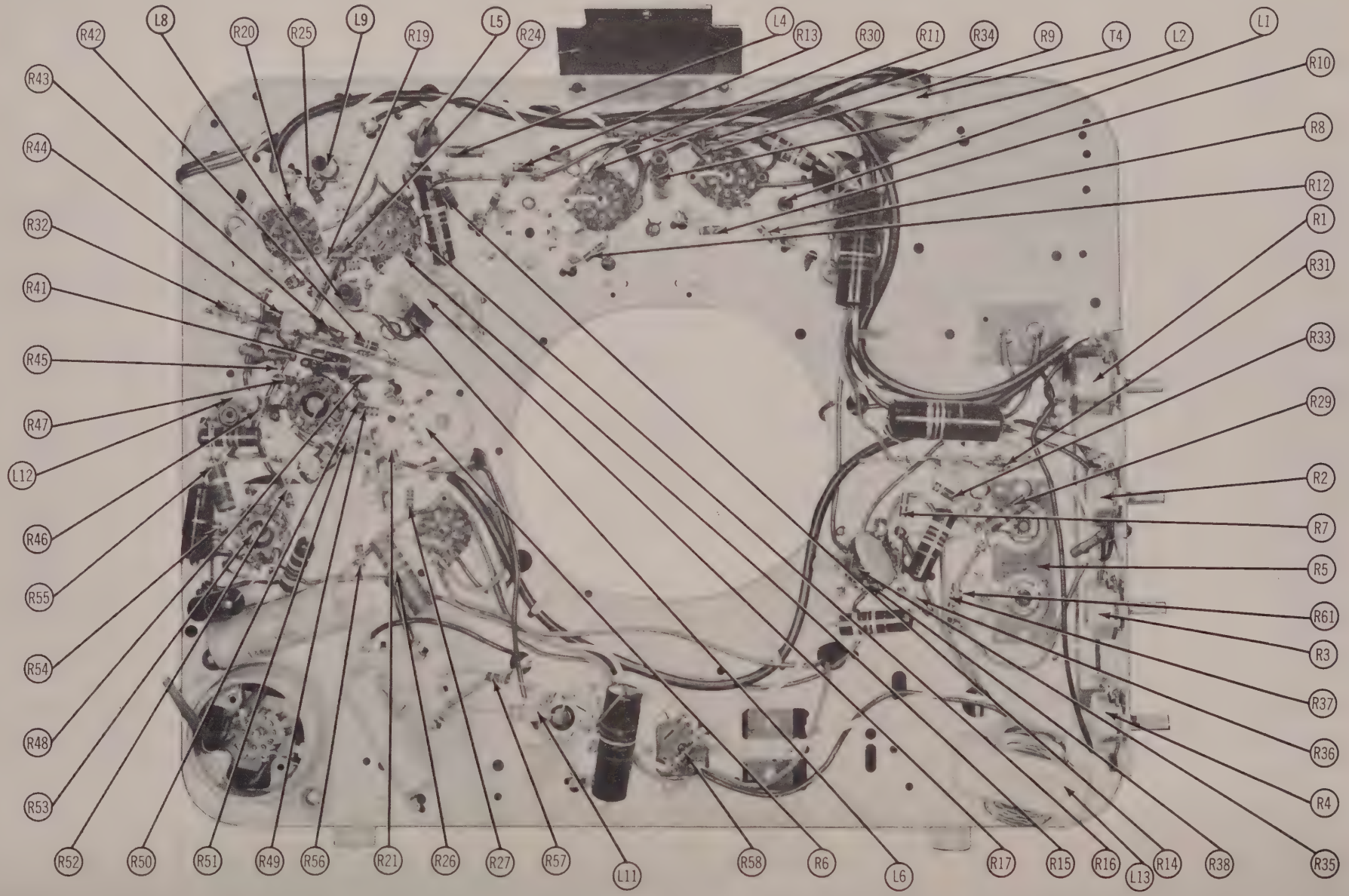
NAME	PART NO.	DESCRIPTION
Safety Glass	17X198-2	
Knob	10A936-1	VHF Channel Selector
Knob	10A937-1	VHF Fine Tuning
Knob	10A939	UHF Tuning
Knob	10A940	UHF Indicator
Knob	10A936-1	Brightness, Contrast, Vert. Hold, On-Off-Volume
Cabinet	S-35A526	

WIRING DATA

High Voltage Lead	Use BELDEN No. [redacted]
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. [redacted]
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8464 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

AIRLINE MODELS WG-4203A, WG-4303A

FOLDER 1



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TUNER PARTS LIST AND DESCRIPTIONS

25A1173

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	2BN4	
V202	Mixer-Osc.	5CG8	
V203	UHF Osc.	2AF4A	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	PART No.	NOTES
R201	4700Ω			
R202	1000Ω			
R203	10K			
R204	220K			
R205	1000Ω			
R206	10K			
R207	10K			
R208	5600Ω			
R209	10K			
R210	2200Ω	1		
R211	1000Ω			

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C201	120			BPD-00012	DD-121	L10T12	CNO-312	5TCC-T12	
C202	30		13M320U300NH-Z3						5%
C203	15			NPO-DI 15	DD-150	L10Q15	CNO-415	5TCC-Q15	10%
C204	15		13L8GP150J		DTZ-15		CNO-415		5%
C205	2-10		31B-206-07						
C206	47		13M113						
C207	800		13M320EA801Z-Z3						
C208	2-6		31B-206-01						
C209	800		13M320EA801Z-Z3						
C210	51		13L-029						N470 10%
C211	2-6		31B-206-01						
C212	1			NPO-SI 1	TCZ-1		CNO-510	5TCCB-V1	10%
C213	1000			BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C214	82		13M320F850NH-Z3						
C215	1000		31J-024	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C216	10		13L8F100F						N1400 10%
C217	10		13L8T100D						N470 5%
C218	1.8		13L8C1R8C						NPO
C219	800		13M320EA801Z-Z3						
C220	1000			BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C221	800		13M320EA801Z-Z3						
C222									
C223	30								5%
C224									
C225									
C226	4.5		BR-023						N470
C227	150								
C228	1000		13M-320EA102Z-03	EF-001	MFT-1000			503C-D1	
C229	800		13M-320EA801Z-Z3						
C230	1000			BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C231	1000		13M-320EA102Z-03	EF-001	MFT-1000			503C-D1	
C232	1000		13M-320EA102Z-03	EF-001	MFT-1000			503C-D1	

NOTE: Part numbers listed are "Standard Coil" part numbers.

COILS (RF-IF)

ITEM No.	USE	PART No.	NOTES
L201	VHF Ant. Trans.	31T-3066 †	
L202	IF Trap	34A763 †	
L203	IF Trap	34A762	
L204	Ant., RF, Mixer Grid & Osc.Coils	31T-2087	Includes rotor disc assy.
L205	Mixer Plate	31U-580	
L206	RF Choke	25A-211-01	
L207	UHF Ant. Input Assy.	31T-2163	
L208	RF Choke	25A-208	
L209	RF Choke	31K-137-02	
L210	RF Choke	31K-137-021	
L211	RF Choke	25A-207	
L212	Fil. Choke	31K-137-019	
L213	Cathode Choke	31K-137-018	

NOTE: Part numbers listed above are "Standard Coil" part numbers. † Part of M201.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	PART No.	REPLACEMENT DATA	
K201	Ant. Coupling	470mmf, .3-1meg	13P-198	Centralab Sprague	RC-471 AC1-1
K202	Ant. Coupling	470mmf, .3-1meg	13P-198	Centralab Sprague	RC-471 AC1-1
K203	Ant. Coupling	470mmf, .3-1meg	13P-198	Centralab Sprague	RC-471 AC1-1
K204	Ant. Coupling	470mmf, .3-1meg	13P-198	Centralab Sprague	RC-471 AC1-1

NOTE : Part numbers listed above are "Standard Coil" part numbers.

TUNER PARTS LIST AND DESCRIPTIONS (Continued)

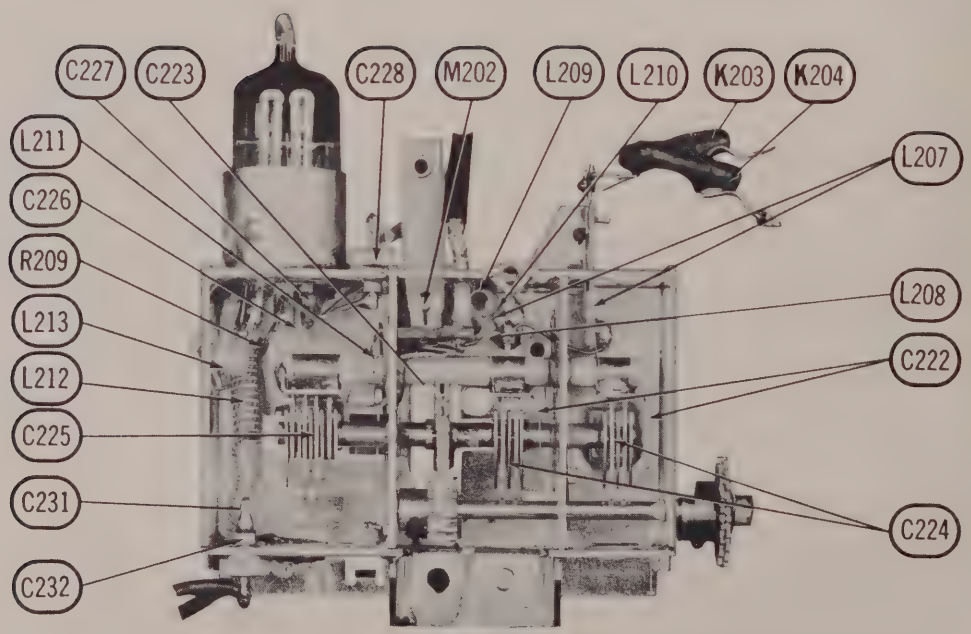
MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
M201	Ant. Input Assy.	31T-2086	Includes L201, L202, C201, K201, K202
	UHF Adaptor	25A1164	Includes rear cover
	VHF Cover	31T-3093	
	Contact Spring	23A-132	
	Osc. Slug	15A-276	
	UHF Extension Contact	23A-148-01	
	UHF Board Assy.	31J-012-01	

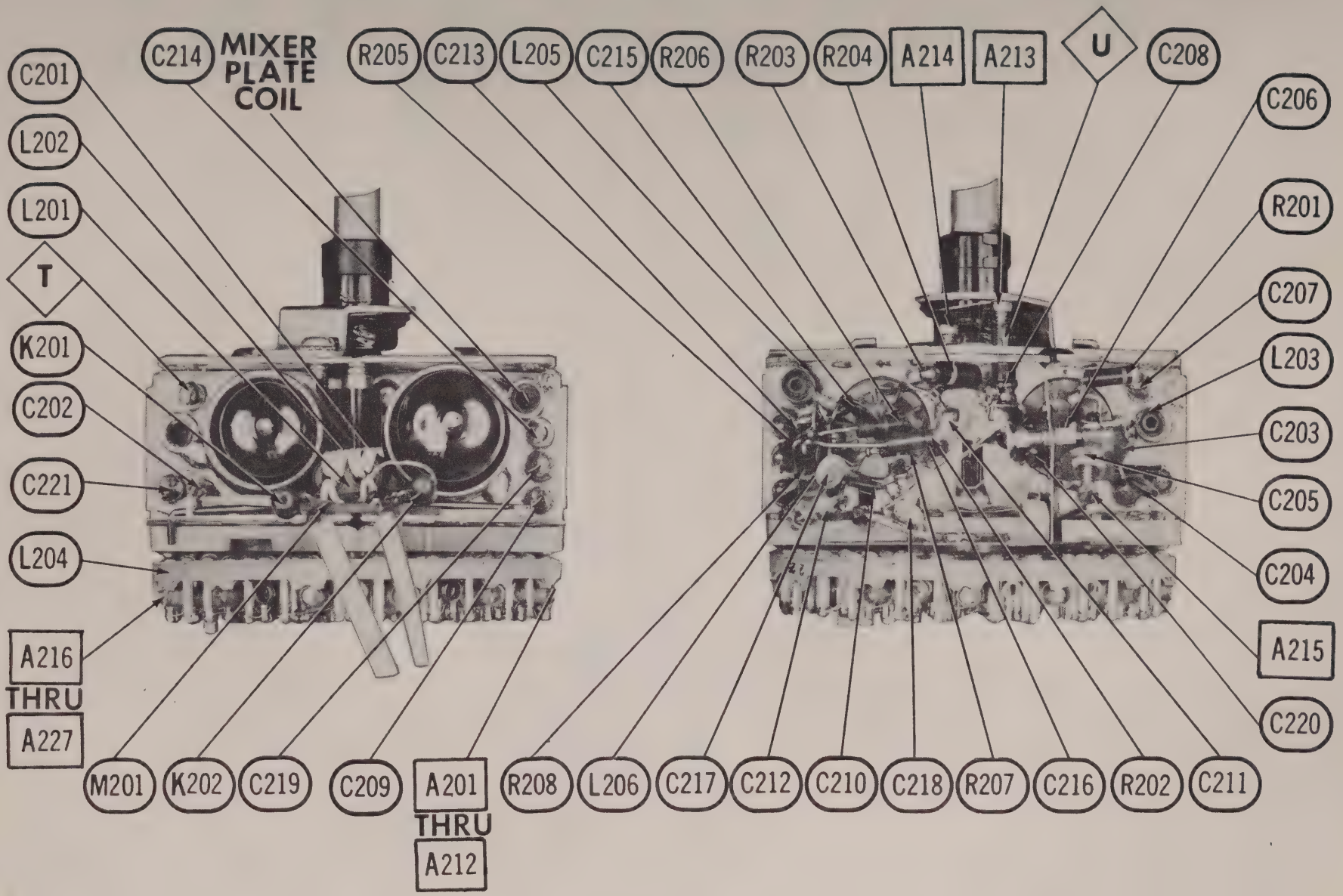
NOTE: Part numbers listed above are "Standard Coil" part numbers.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		PART No.	CBS PART No.	SYLVANIA PART No.	
M202	1N82A		1N82A	1N82A	UHF Mixer (Clip-in)



UHF TUNER 25A1159

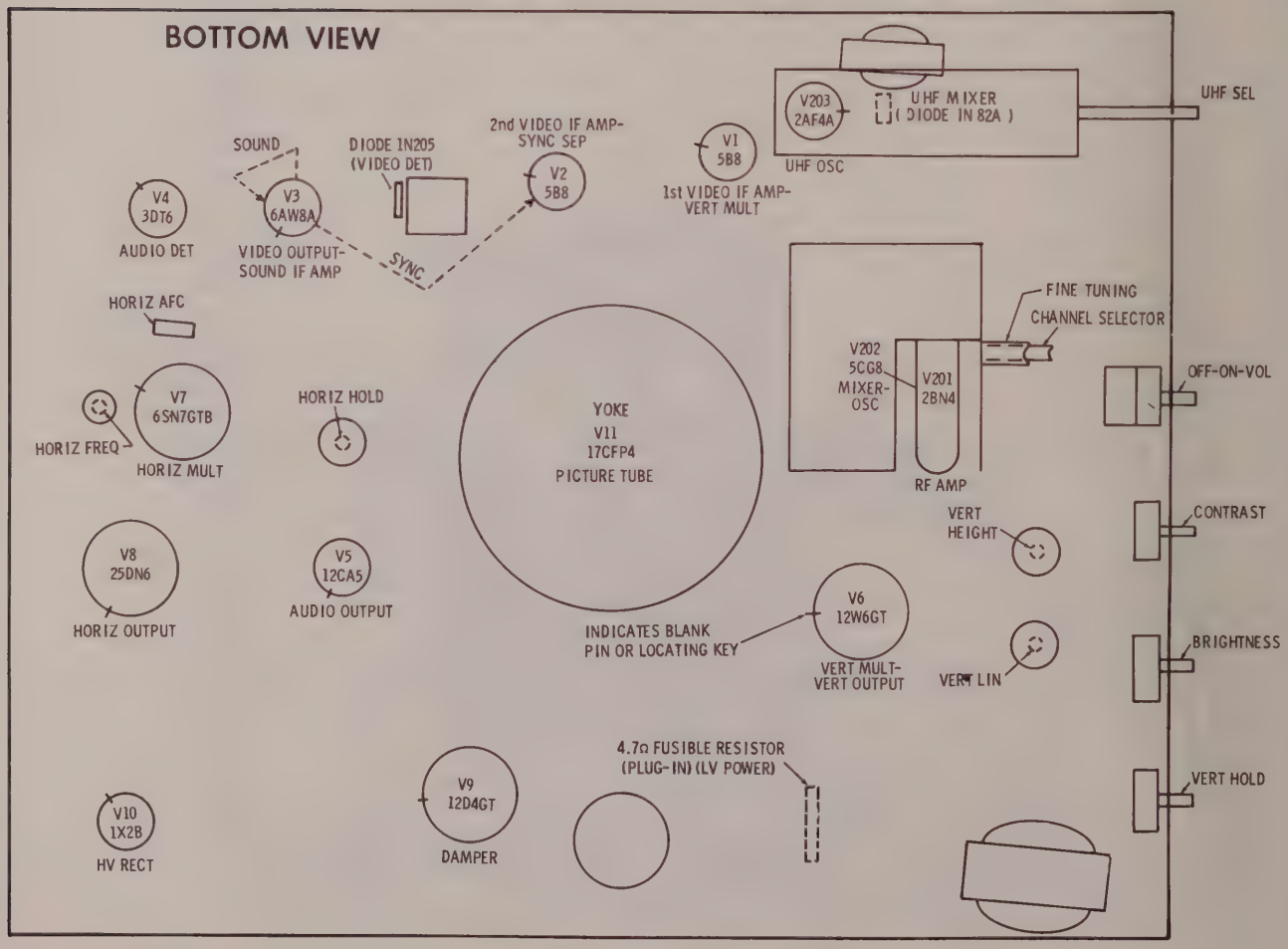


VHF TUNER 25A1173

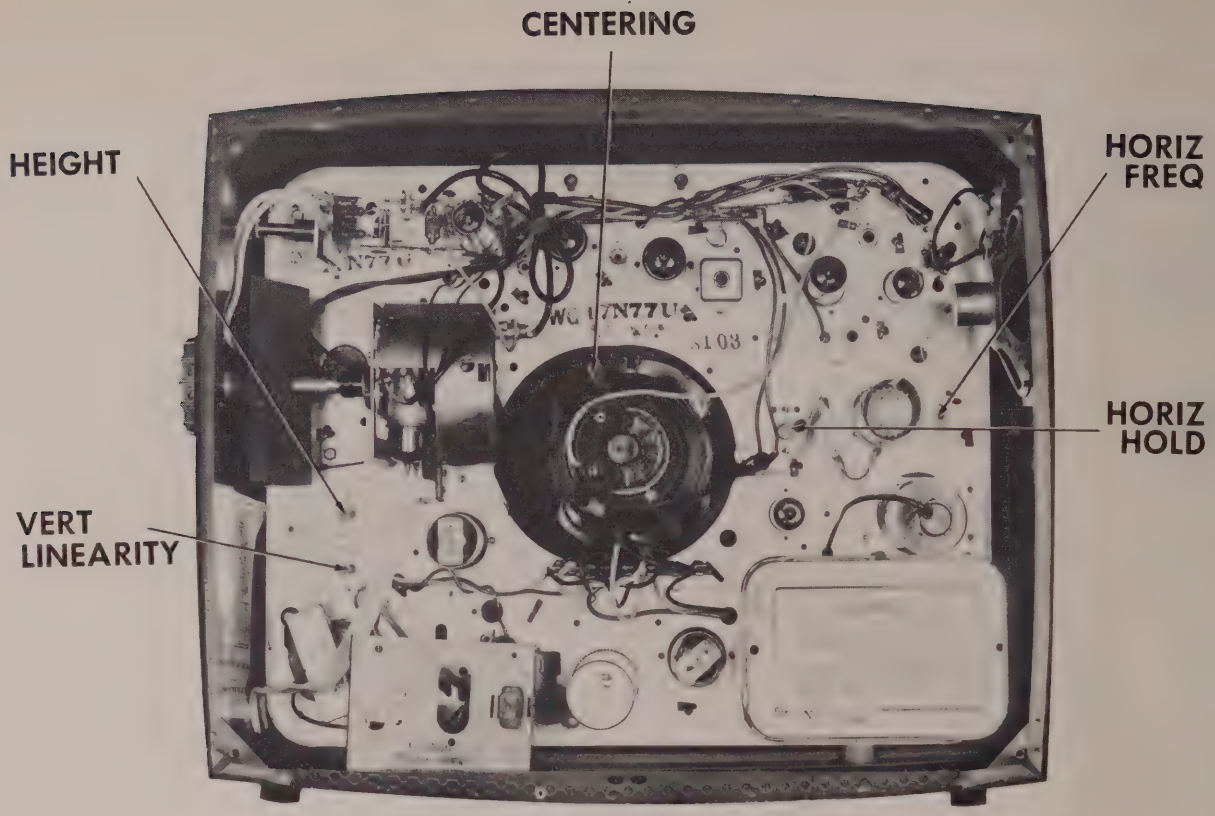
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	5B8	0Ω	•1.1meg	•†1.8meg	9Ω	10Ω	1meg	56Ω	†150Ω	†150Ω
V2	5B8	0Ω	2.4meg	†9000Ω	8Ω	9Ω	.1Ω	180Ω	†150Ω	†150Ω
V3	6AW8A	0Ω	100K	†35K	6.5Ω	8Ω	• 175Ω	• 1.5meg	†0Ω	†3300Ω
V4	3DT6	4.3Ω	680Ω	6.5Ω	6Ω	‡700K	†2200Ω	680K		
V5	12CA5	120Ω	0Ω	18.5Ω	16Ω	0Ω	†2200Ω	†230Ω		
V6	12W6GT	TP	13.5Ω	†255Ω	†17Ω	•2.3meg	TP	16Ω	0Ω	
V7	6SN7GTB	1.8meg	†12K	1200Ω	• 70K	†47K	1200Ω	4Ω	6Ω	
V8	25DN6	TP	18.5Ω	0Ω	TP	440K	TP	23Ω	†1200Ω	TOP CAP ‡13Ω
V9	12D4GT	NC	TP	¶500K	NC	†0Ω	NC	0Ω	2.5Ω	
V10	1X2B	PINS 1 THRU 9 HAVE INFINITE RESISTANCE								TOP CAP ‡468Ω
V11	17CFP4	2.5Ω	11.5Ω	Pin 6 ‡27K	Pin 10 ‡27K	Pin 11 • 290K	Pin 12 4Ω			
V201	2BN4	0Ω	1meg	11.5Ω	12.5Ω	†1200Ω	0Ω	1meg		
V202	5CG8	10K	†5800Ω	0Ω	10Ω	11.5Ω	†1200Ω	†10K	0Ω	230K
V203	2AF4A	*†3500Ω	*10K	13.5Ω	12.5Ω	*.1Ω	*10K	*†3500Ω		
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY VARY. CONTROL SET FOR NORMAL OPERATION.
* MEASURED IN "UHF" POSITION.
† MEASURED FROM 145V SOURCE. NC NO CONNECTION.
‡ MEASURED FROM PIN 3 OF V9. TP TIE POINT.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

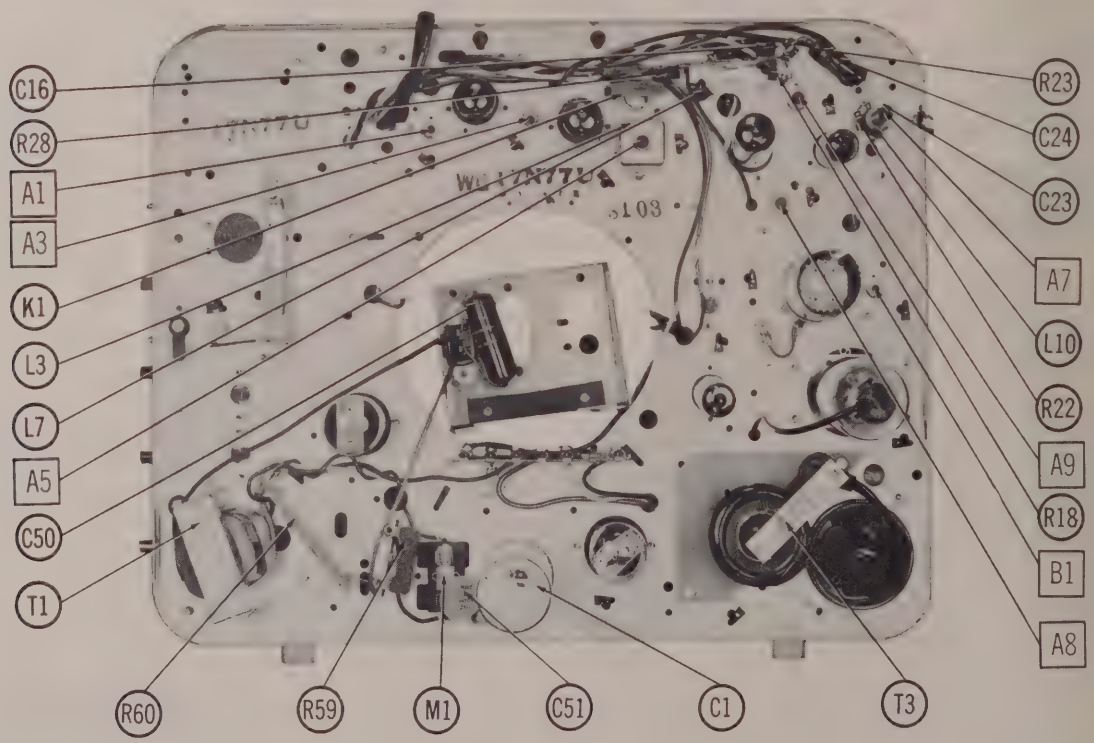
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Suggested alignment tools: General Cement #8282, 8606, 8606L or 9295
Walsco #2543, 2544 or 2545

Turn the set on and tune in a station, preferably with a test pattern.

Set the Horizontal Hold control at the center of its range and adjust the Horizontal Frequency slug (B1) until picture synchronizes horizontally.

Check horizontal sync on other channels and if necessary, retouch B1 for best sync on all channels.



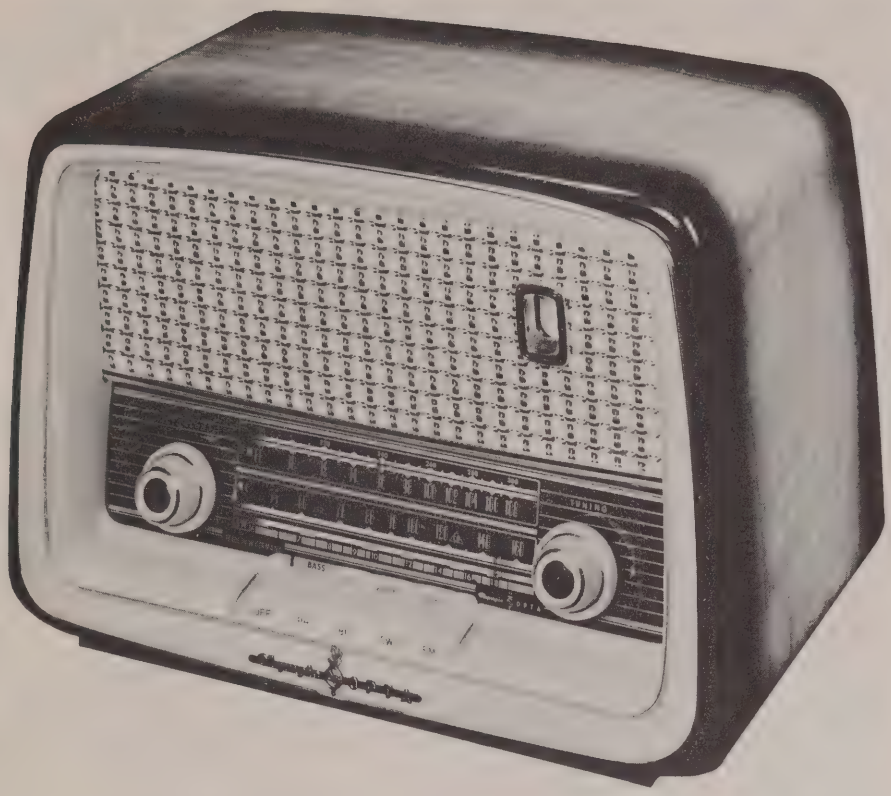
CHASSIS— TOP VIEW

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

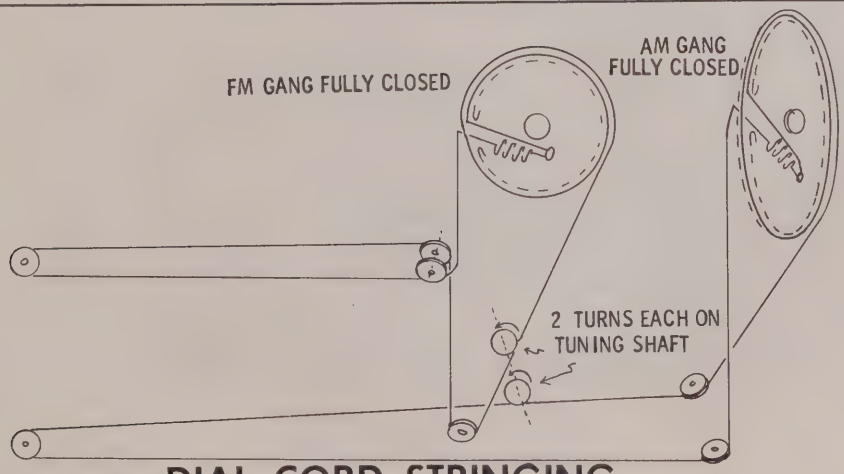
OLYMPIC-OPTA
MODEL 5711W

OLYMPIC-OPTA
MODEL 5711W



OLYMPIC-OPTA
MODEL 5711W

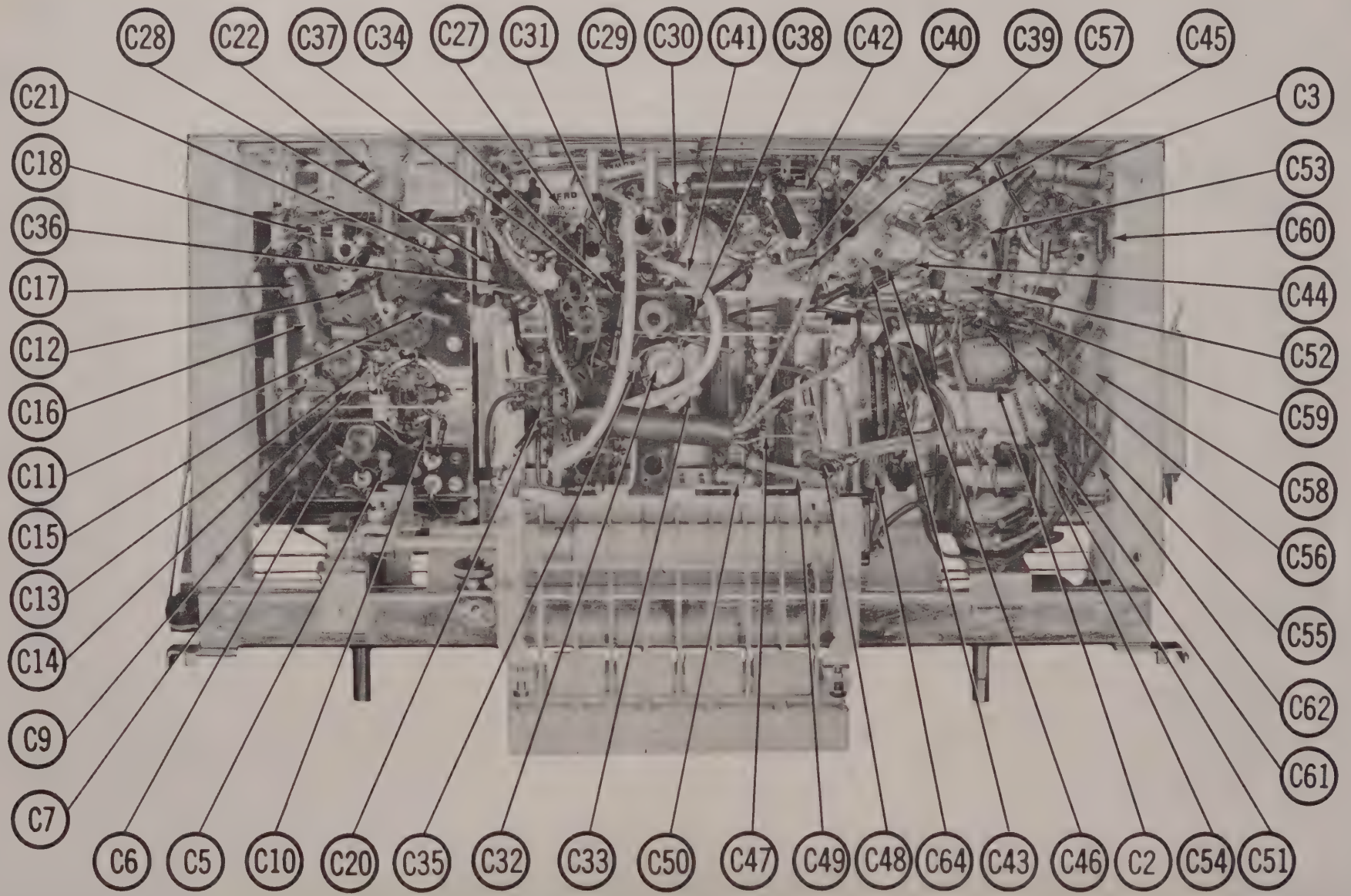
TRADE NAME	Olympic-Opta Model 5711W		
MANUFACTURER	Olympic Radio & Tel. Corp., 34-01 38th Ave., Long Island City 1, N. Y.		
TYPE SET	AC Operated FM-BC-SW Receiver		
TUBES (Six)	Types ECC85/6AQ8 FM RF Amp.-FM Conv., ECH81/6AJ8 1st FM IF Amp.-AM Mixer-AM Osc., EF89/6DA6 2nd FM-1st AM IF Amp., EABC80/6T8 Ratio Det.-AM Det.-AVC-AF Amp., EM80/6BR5 Tuning Indicator, EL84/6BQ5 Output		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING	.40 Amp. @ 117 Volts AC (41 Watts)
TUNING RANGE - BROADCAST	535 - 1620KC	FREQ. MOD.	88 - 108MC
		SHORT WAVE	5.9 - 18.5MC



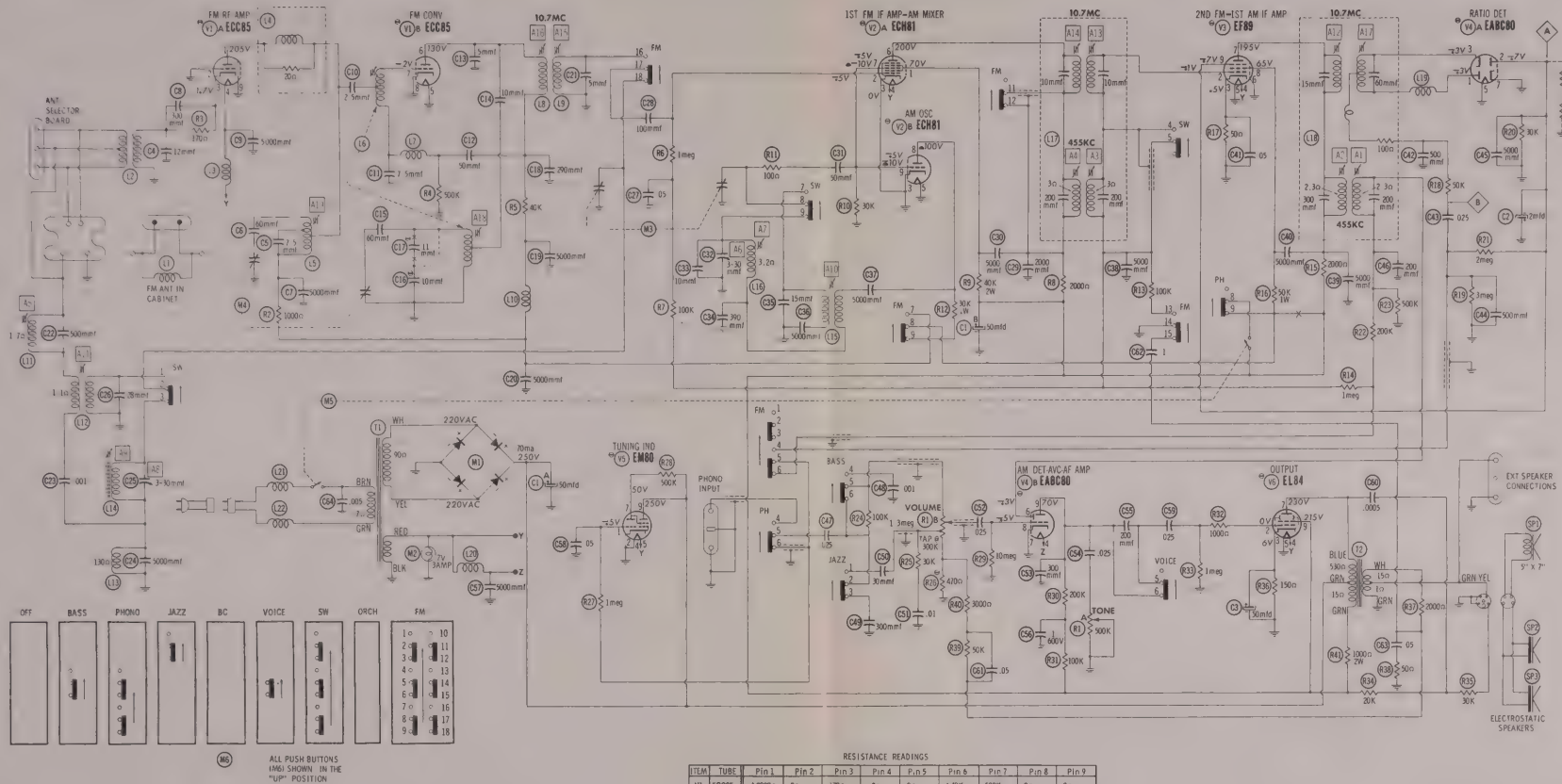
DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC85	†2000Ω	0Ω	170Ω	.2Ω	0Ω	†40K	500K	0Ω	0Ω
V2	ECH81	†40K	1.2meg	0Ω	1Ω	0Ω	†3000Ω	30K	⁺30K	30K
V3	EF89	0Ω	100K	50Ω	1Ω	0Ω	0Ω	†3000Ω	†50K	30K
V4	EABC80	INF	30K	INF	1Ω	0Ω	350K	0Ω	10meg	†400K
V5	EM80	2meg	0Ω	†0Ω	0Ω	.1Ω	NC	†500K	†0Ω	†0Ω
V6	EL84	1meg	1meg	150Ω	.1Ω	0Ω	NC	†530Ω	NC	†1000Ω

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
† MEASURED FROM OUTPUT OF M1.
⁺ MEASURED IN "AM" POSITION.
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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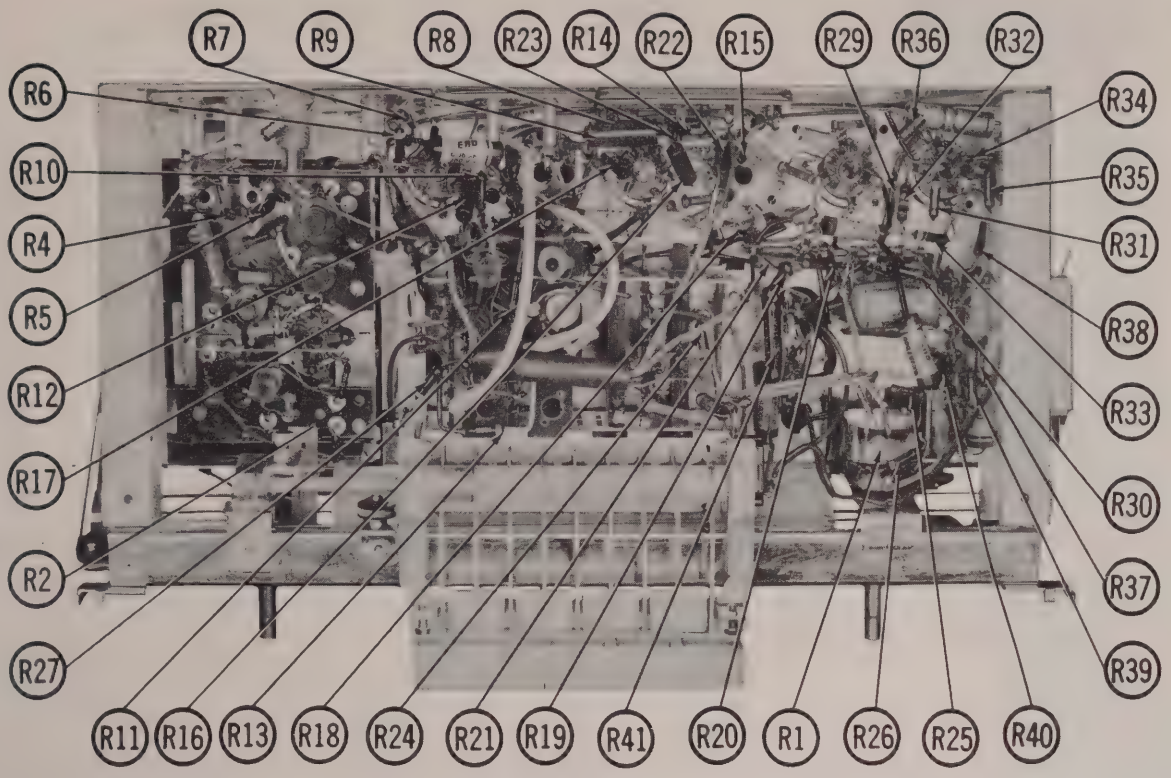
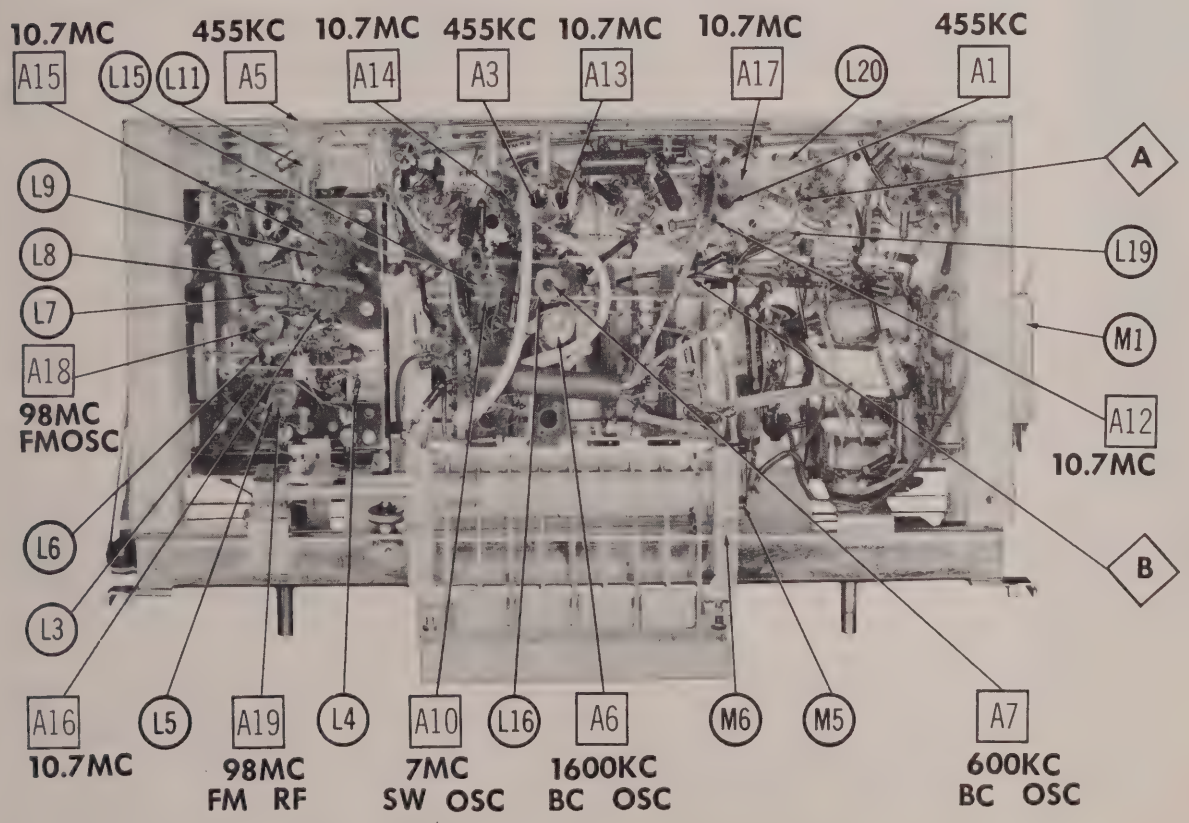
424-11



CHASSIS BOTTOM VIEW - ALIGN., INDUCTOR & MISC. IDENT.



CHASSIS BOTTOM VIEW - RESISTOR IDENT.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	High side to pin 2 (grid) of ECH81 (V2). Low side to chassis.	455KC (400∿ Mod)	BC	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	High side to AM antenna receptacle. Low side to chassis.	"	"	"	"	A5	"
3.	"	"	1600KC	"	1600KC	"	A6	"
4.	"	"	600KC	"	600KC	"	A7	Adjust for maximum output while rocking tuning gang. Repeat steps 3 and 4.
5.	"	"	1500KC	"	Tune to 1500KC signal	"	A8	Adjust for maximum output.
6.	"	"	600KC	"	Tune to 600KC signal	"	A9	"
7.	200mmf	"	7MC	SW	7MC	"	A10, A11	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100K (±1%) resistors in series from point Ⓐ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.		High side to ungrounded tube shield of ECC85 (V1). Low side to chassis.	10.7MC (Unmod.)	FM	Point of non-interference	DC probe to point Ⓐ. Common to chassis.	A12, A13, A14, A15, A16	Adjust for maximum deflection.
9.		"	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A17	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
8.		High side to ungrounded tube shield of ECC85 (V1). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point Ⓐ. Low side to chassis.	A12, A13, A14, A15, A16	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1
9.		"	"	"	"	Vert. Amp. to point Ⓑ. Low side to chassis.	A17	Reconnect stabilizing capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A12 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
10.	270Ω Carbon Resistor	Across FM antenna receptacle	98MC (Unmod.)	FM	98MC	DC probe to point Ⓐ. Common to chassis.	A18, A19	Adjust for maximum deflection.

FIG. 1

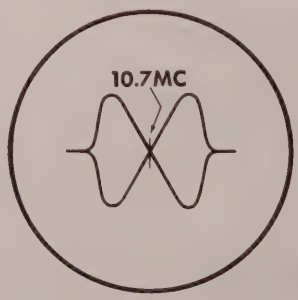


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	FM RF Amp. - FM Conv.	ECC85/6AQ8 ①
V2	1st FM IF Amp. - AM Mixer - AM Osc.	ECH81/6AJ8 ①
V3	2nd FM-1st AM IF Amp.	EF89/6DA6 ①
V4	Ratio Det. - AM Det. - AVC - AF Amp.	EABC80/6T8 ①
V5	Tuning Indicator	EM80/6BR5 ①②
V6	Output	EL84/6BQ5 ①

① Domestic type listed may not be directly interchangeable in some instances.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Olympic-Opta PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	385		PRS450V4040	BBRD4445				R2462 *
B	50	385							
C2	2	80		PRS450V2	BR245	TT150X2	TD-2-450	MT-4502	TVA-1701
C3	50	15		PRS25V50	BR505	TC29	TD-50-25	MT-0250	TVA-1206

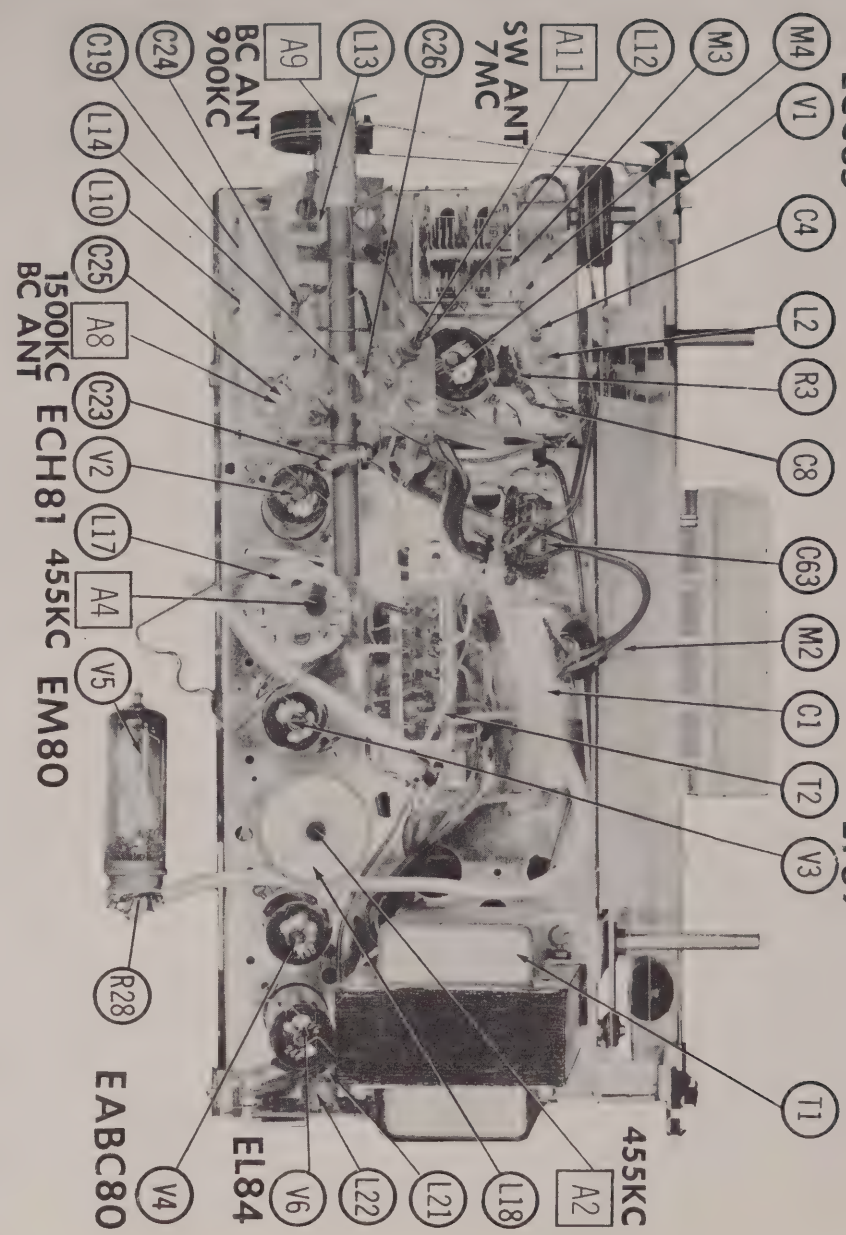
* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Olympic-Opta PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	12			SI 12	D6-120	LT6Q12	UC-5412	5GA-Q12	
C5	7.5							5GA-V75	
C6	60								
C7	5000			SI 5000	D6-502	LT6D5	UC-525	5HK-D5	
C8	300			DI 300	DD-301	L10T3	UC-533	5GA-T3	
C9	5000			SI 5000	D6-502	LT6D5	UC-525	5HK-D5	
C10	25			SI 25	D6-250	LT6Q25	UC-5425	5GA-Q25	
C11	7.5							5GA-V75	
C12	50			SI 50	D6-500	LT6Q5	UC-545	5GA-Q5	
C13	5			DI 5	DD-050	L10V5	ZT-555	5GA-V5	
C14	10			SI 10	D6-100	LT6Q1	UC-541	5GA-Q1	
C15	60								
C16	10			SI 10	D6-100	LT6Q1	UC-541	5GA-Q1	②③
C17	11								
C18	290								
C19	5000			SI 5000	D6-502	LT6D5	UC-545	5HK-D5	
C20	5000			SI 5000	D6-502	LT6D5	UC-545	5HK-D5	
C21	5			DI 5	DD-050	L10V5	ZT-555	5GA-V5	
C22	500			1468-0005	DD-501	5W5T5	MC245	1FM-35	
C23	.001	500		P688N-001	D6-102	CUB6D1	GEM-621	6TM-D1	
C24	5000			SI 5000	D6-502	LT6D5	UC-525	5HK-D5	
C25	3-30								
C26	28			SI 27	D6-270	LT6Q27	UC-5427	5GA-Q27	
C27	.05	500		P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C28	100								
C29	2000			1467-002	DD-202	1W5D2	MC457	1FM-22	
C30	5000			SI 5000	D6-502	LT6D5	UC-525	5HK-D5	
C31	50			SI 50	D6-500	LT6Q5	UC-545	5GA-Q5	
C32	3-30								
C33	10			SI 10	D6-100	LT6Q1	UC-541	5GA-Q1	
C34	390			SI 390	D6-391	LT6T39	UC-5339	5GA-T39	
C35	15			SI 15	D6-150	LT6Q15	UC-5415	5GA-Q15	
C36	5000			1467-005	DD-502	1W5D5	MC465	1FM-25	
C37	5000			SI 5000	D6-502	LT6D5	UC-525	5HK-D5	
C38	5000			SI 5000	D6-502	LT6D5	UC-525	5HK-D5	
C39	5000			SI 5000	D6-502	LT6D5	UC-525	5HK-D5	
C40	5000			SI 5000	D6-502	LT6D5	UC-525	5HK-D5	
C41	.05	250		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C42	500			1468-0005	DD-501	5W5T5	MC245	1FM-35	
C43	.025	250		P488N-025		CUB4S22	GEM-4125	4TM-S25	
C44	500			1468-0005	DD-501	5W5T5	MC245	1FM-35	
C45	5000			SI 5000	D6-502	LT6D5	UC-525	5HK-D5	
C46	200			1468-0002	DD-201	5W5T2	MC237	1FM-32	
C47	.025	250		P488N-025		CUB4S22	GEM-4125	4TM-S25	
C48	.001	500		P488N-001	D6-102	CUB6D1	GEM-621	6TM-D1	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Olympic-Opta PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C49	300			SI 300	D6-301	LT6T3	UC-533	5GA-T3	
C50	30			SI 30	TCZ-30	CTA6Q3C		5GA-Q3	
C51	.01	250		P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C52	.025	250		P488N-025		CUB4S22	GEM-4125	4TM-S25	
C53	300			BPD-0003	DD-301	L10T3	UC-533	5GA-T3	
C54	.025	500		P488N-025		CUB6S22	GEM-6125	6TM-S25	
C55	200			SI 200	D6-201	LT6T2	UC-532	5GA-T2	
C56	.1	600		P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C57	5000			SI 5000	D6-502	LT6D5	UC-525	5HK-D5	
C58	.05	250		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C59	.025	500		P488N-025		CUB6S22	GEM-6125	6TM-S22	
C60	.0005	500		P688N-0005	D6-501	CUB6T5		6TM-T5	
C61	.05	250		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C62	.1	125		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C63	.05	250		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C64	.005	500		P688N-005	D6-502	CUB6D5	GEM-625	6TM-D5	

① When C16 is 5.6mmf, C17 is not used.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Olympic-Opta PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A B	500K 1.3meg	½ ½	PTG25086					Tone Volume, Tap ② 300K

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Olympic-Opta PART No.	NOTES
R2	1000Ω			
R3	170Ω			
R4	500K			
R5	40K			
R6	1meg			
R7	100K			
R8	2000Ω			
R9	40K	2		
R10	30K			
R11	100Ω			
R12	30K	1		
R13	100K			
R14	1meg			
R15	2000Ω			
R16	50K	1		
R17	50Ω			
R18	50K			
R19	3meg			
R20	30K			
R21	2meg			

ITEM No.	RATING OHMS	RATING WATT	Olympic-Opta PART No.	NOTES
R22	200K			
R23	500K			
R24	100K			
R25	30K			
R26	470Ω			Note 1
R27	1meg			
R28	500K			
R29	10meg			
R30	200K			
R31	100K			
R32	1000Ω			
R33	1meg			
R34	20K			
R35	30K			
R36	150Ω			
R37	2000Ω			
R38	50Ω			
R39	50K			
R40	3000Ω			
R41	1000Ω	2		

Note 1. Some versions may use 500Ω in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA Olympic-Opta PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Coil		19-1007	TV-189	4594	VP-9	.8 Microhenry
L2	FM Ant. Trans						
L3	Fil. Choke		19-1001	BC-562	4604		1.5 Microhenry
L4	RF Choke						Wound on 20Ω Resistor
L5	FM RF Coil						
L6	FM Osc. Coil						
L7	RF Choke						1.9 Microhenry
L8	1st FM IF Prl.						
L9	1st FM IF Sec.						
L10	RF Choke						1.9 Microhenry
L11	IF Trap						

COILS (cont)

ITEM No.	USE	REPLACEMENT DATA Olympic-Opta PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L12	SW Ant. Trans.						
L13	Ant. Coil						
L14	Loop Stick						
L15	SW Osc. Coil						
L16	BC Osc. Coil						
L17A	2nd FM IF	TRG25079					
B	1st AM IF						
L18A	Ratio Det.	TRG25080					
B	2nd AM IF						
L19	RF Choke						1.9 Microhenry
L20	Fil. Choke						1.9 Microhenry
L21	Line Choke	CKG25198					31 Microhenries
L22	Line Choke	CKG25198					31 Microhenries

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA Olympic-Opta PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ② .40A	220V ② .070A	6.3V ② 2.7A	TRG25199						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Olympic-Opta PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	8000Ω Tap ② 100Ω	350Ω Tap ② 5-6Ω	TRG25072 (ATR11A)							

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA Olympic-Opta PART No.	QUAM PART No.	NOTES
SP1	5" x 7"	PM	5-6Ω	SKG25081		
SP2	3"	Electrostatic		SKG25071		
SP3	3"	Electrostatic		SKG25071		

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Olympic-Opta PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.071A	RFG25062 (250/C75)		60-9150 ①	D-64 ②	① Two used. ② Silicon Type.

MISCELLANEOUS

ITEM No.	PART NAME	Olympic-Opta PART No.	NOTES
M2	Lamp	BU25035	7 Volt .3 Amp.
M3	Tuning Cap.	CVG25085	AM, 2 Gang (Ant. 11-553mmf, Osc. 14-561mmf)
M4	Tuner	CVG25106	FM, Completely Wired
M5	Switch	SWG25187	On-Off, Snap Type
M6	Switch Ass'y	PBG25200	Function, Slide Type, Completely Wired

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT* Folder

with CIRCUITRACE*

PHILCO MODELS G4230E, G4642S, SL, G4646,
L, S, G4664P, UG4230E, UG4642S, SL, UG4646,
L, S, UG4664P (Ch. 9L41, U)

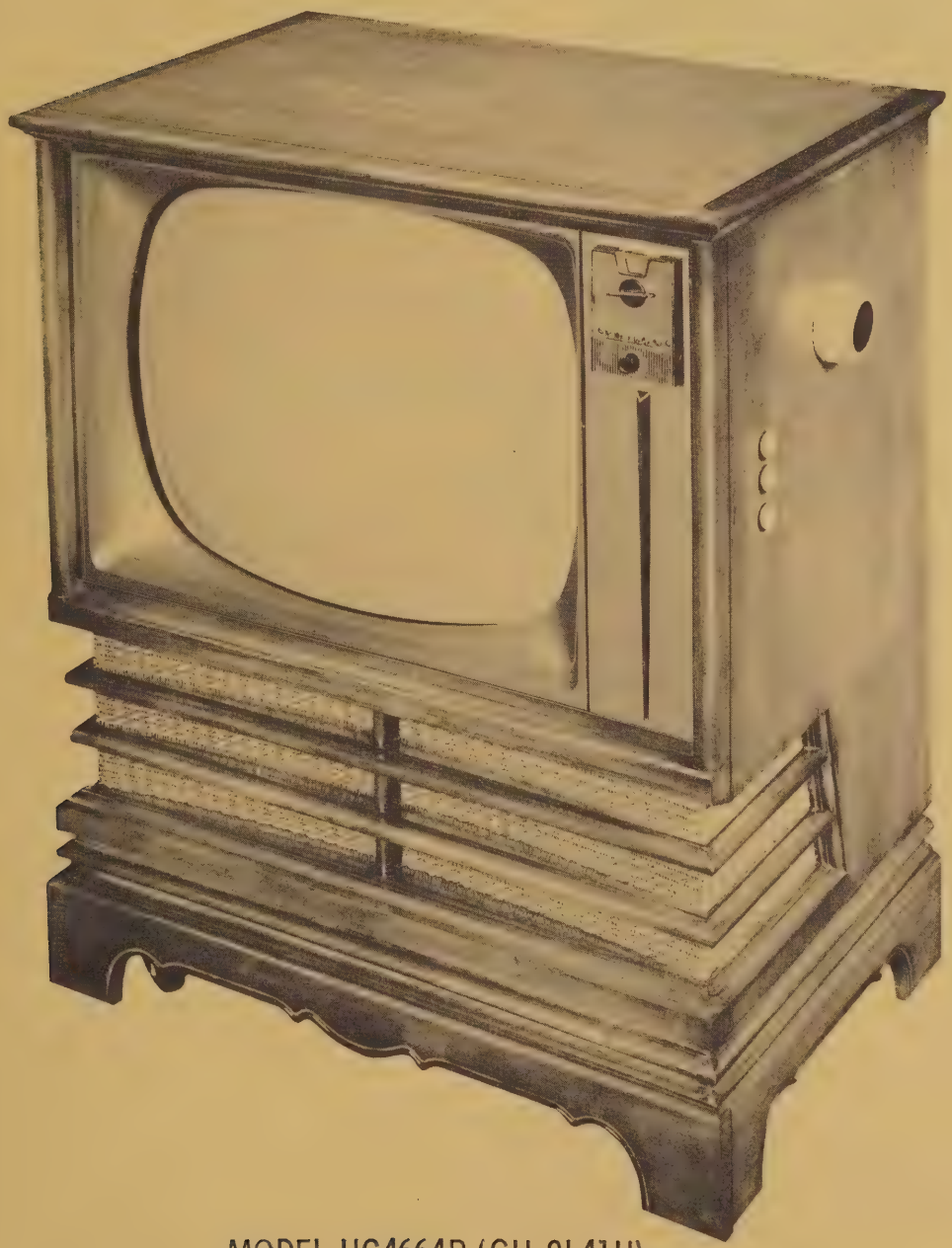
IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PHILCO MODELS G4230E, G4642S, SL, G4646,
L, S, G4664P, UG4230E, UG4642S, SL, UG4646,
L, S, UG4664P (Ch. 9L41, U)

PHILCO MODELS G4230E, G4642S, SL, G4646,
L, S, G4664P, UG4230E, UG4642S, SL, UG4646,
L, S, UG4664P (Ch. 9L41, U)



MODEL UG4664P (CH.9L41U)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

SET 423 FOLDER 2

PHOTOFACT* Folder with CIRCUITRACE*

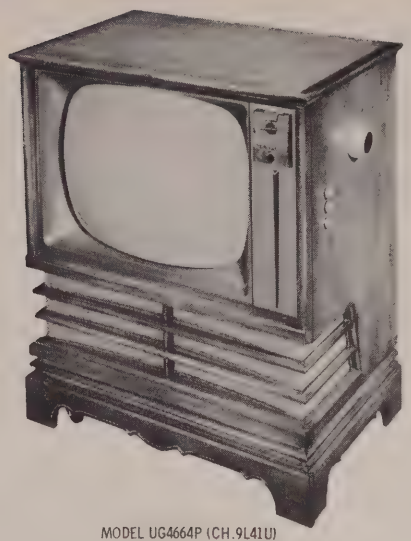
PHILCO MODELS G4230E, G4642S, SL, G4646, L, S, G4664P, UG4230E, UG4642S, SL, UG4646, L, S, UG4664P (Ch. 9L41, U)

PHILCO MODELS G4230E, G4642S, SL, G4646, L, S, G4664P, UG4230E, UG4642S, SL, UG4646, L, S, UG4664P (Ch. 9L41, U)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 2 push-on type knobs from the front, 2 metal screws holding escutcheon and remove dial. Remove 5 push-on type knobs from the side.
2. Remove 11 wood screws holding rear cover. Remove the rear cover.
3. Remove picture tube socket, ground strap, yoke plug, HV and speaker leads.
4. Remove 2 wood screws holding fringe switch bracket.
5. Remove 1 metal screw holding top chassis support.
6. Remove 3 bottom chassis bolts.



MODEL UG4664P (CH.9L41U)

TRADE NAME	Philco	MODELS	CHASSIS
		G4230E, G4642S, SL, G4646, L, S, G4664P	9L41
		UG4230E, UG4642S, SL, UG4646, L, S, UG4664P	9L41U
MANUFACTURER	Philco Corp., Tioga & "C" Streets, Philadelphia, Pa.		
TYPE SET	Television Receiver		
TUBES	Eighteen		
POWER SUPPLY	105-120 Volts AC, 60 Cycle	RATING 165 Watts, 1.55 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Remove 2 metal screws holding Channel Selector escutcheon. Set the Fine Tuning at the center of its range. The adjustments (located in a circle around the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 13 adjustment is located at 9 o'clock, proceed in a counterclockwise direction adjusting for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 4 wood screws holding the Safety Glass trim strip at the top. Tilt glass out at the top and lift up to remove.

SPECIAL ADJUSTMENTS

A. AGC
The AGC may be varied by means of the Fringe switch. (See tube placement chart.)

B. Focus
The focus may be varied by the position of a strap on the base of the Picture Tube. The strap can be connected between pins 6 and 2, or 6 and 10.

C. Width
The width may be varied by means of the Width switch. (See tube placement chart for location.)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

Set Horizontal Hold to center of its range and adjust the Horizontal Range (R4B) until picture synchronizes horizontally. (For location, see tube placement chart.)

FUSE

One fuse is used for low voltage supply protection. (For location, see tube placement chart.)

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

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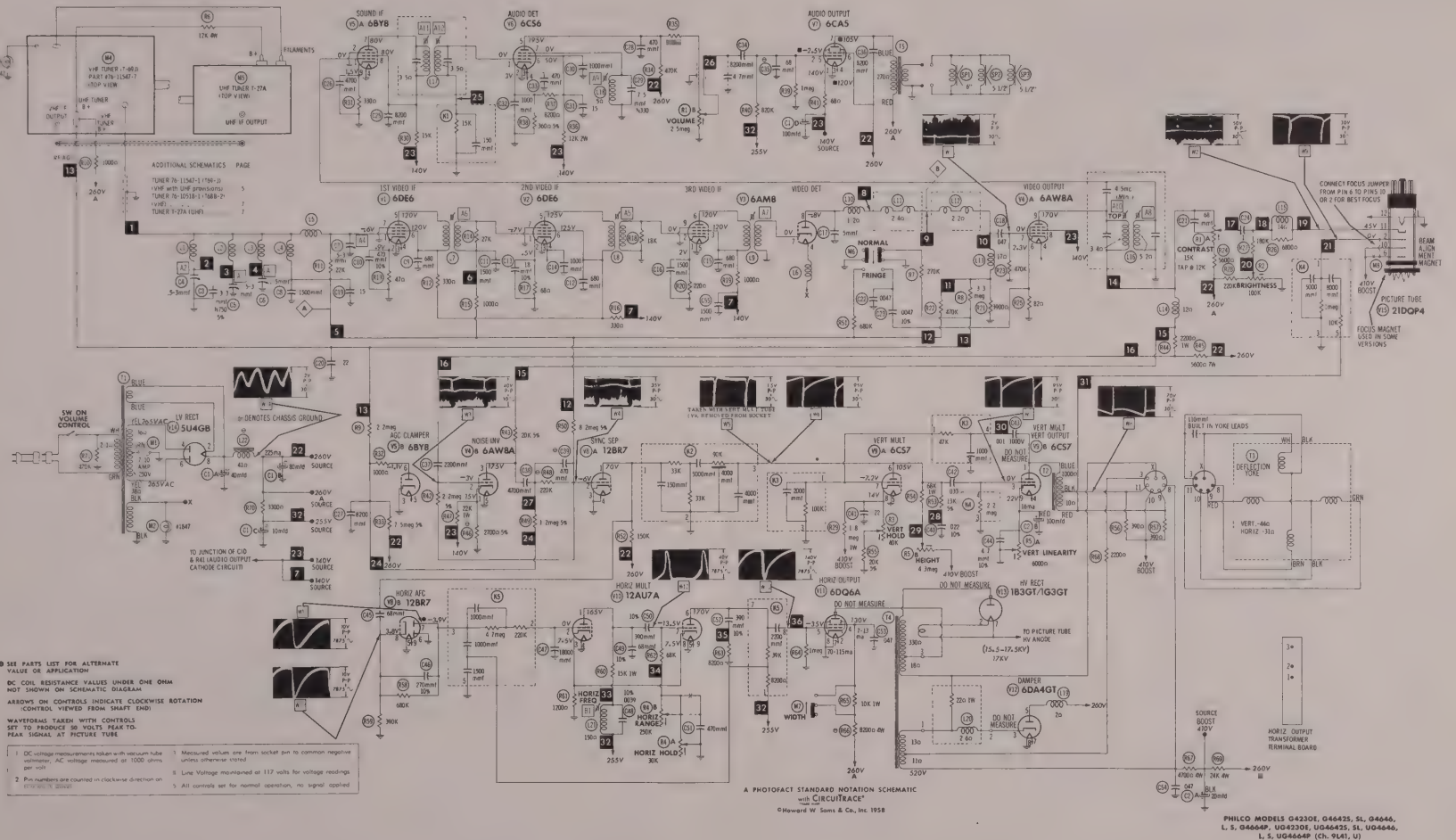
H906

SET 423 FOLDER 2



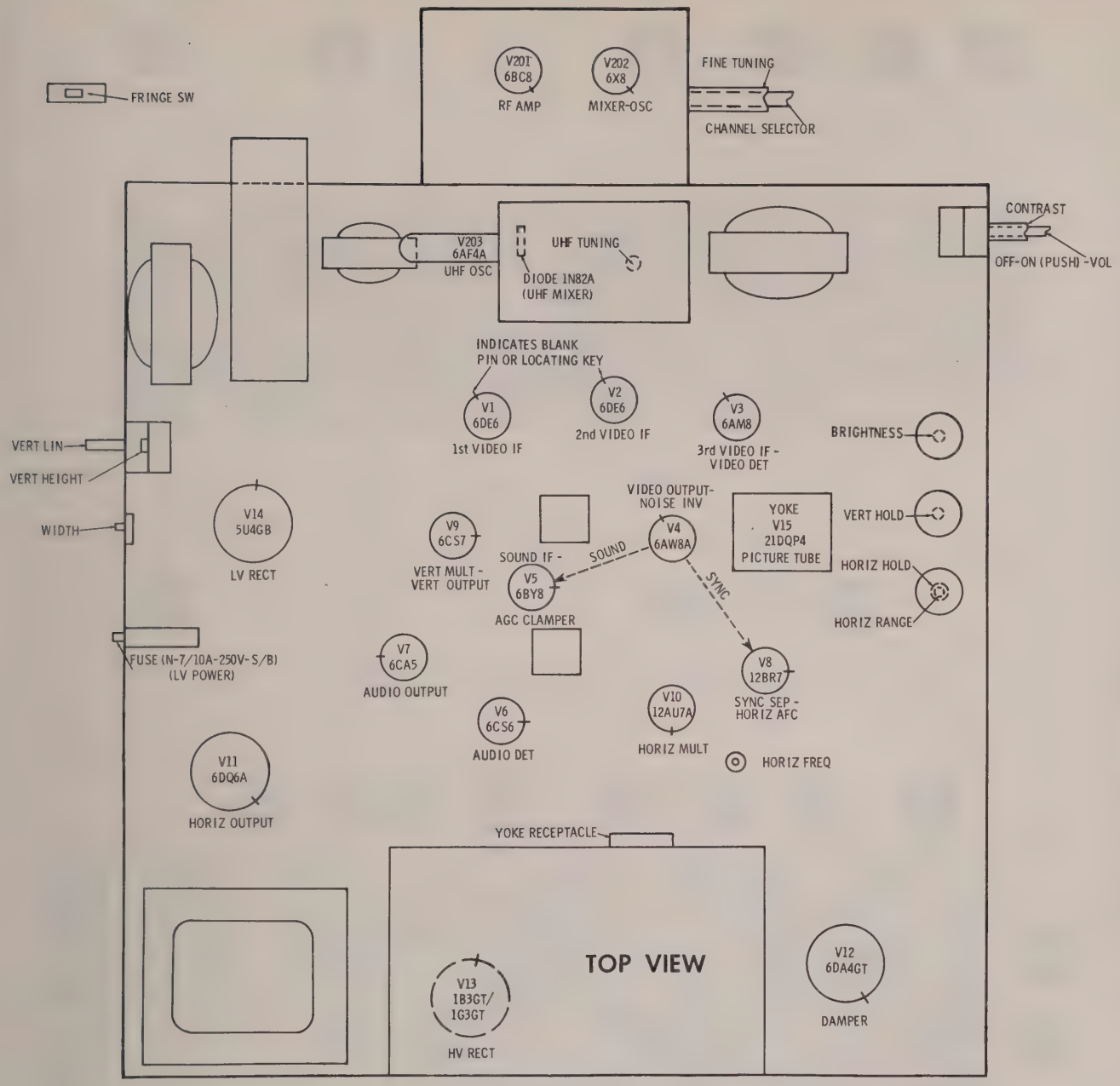
A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

©Howard W. Sams & Co., Inc. 1958

PHILCO MODELS G42305, G46425, SL, G4646, L, S, G4664P, UG42305, UG46425, SL, UG4646, L, S, UG4664P (Ch. 9L41, U)

PHILCO MODELS G42305, G46425, SL, G4646, L, S, G4664P, UG42305, UG46425, SL, UG4646, L, S, UG4664P (Ch. 9L41, U)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound Fuse (LV Power), V14

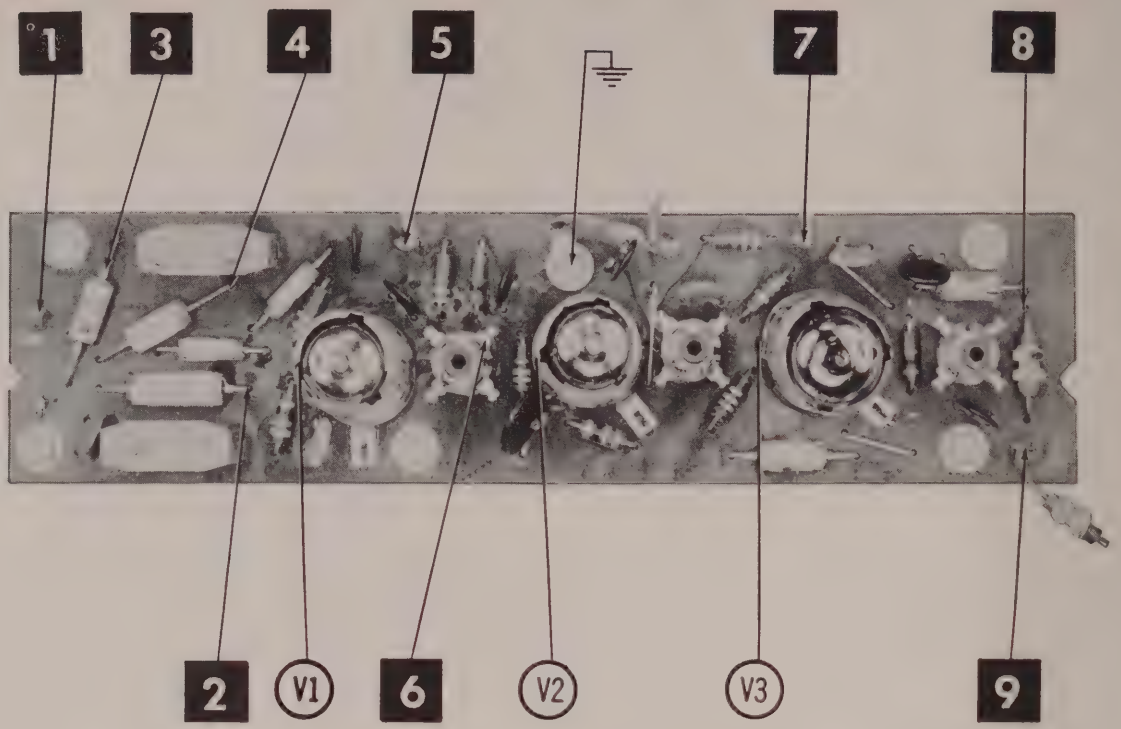
SWEEP FAILURE
No raster, has sound V8, V10, V11, V12, V13, V15
No vertical deflection V9
Poor vert. linearity or foldover V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, V14
Vert. off freq. V9
Horiz. off freq. V10

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, V4
No pic, no sound, has snow V201, V202, V1, (V203 UHF only)
No pic, has sound, has raster V4, V15
Has pic, no sound V5, V6, V7

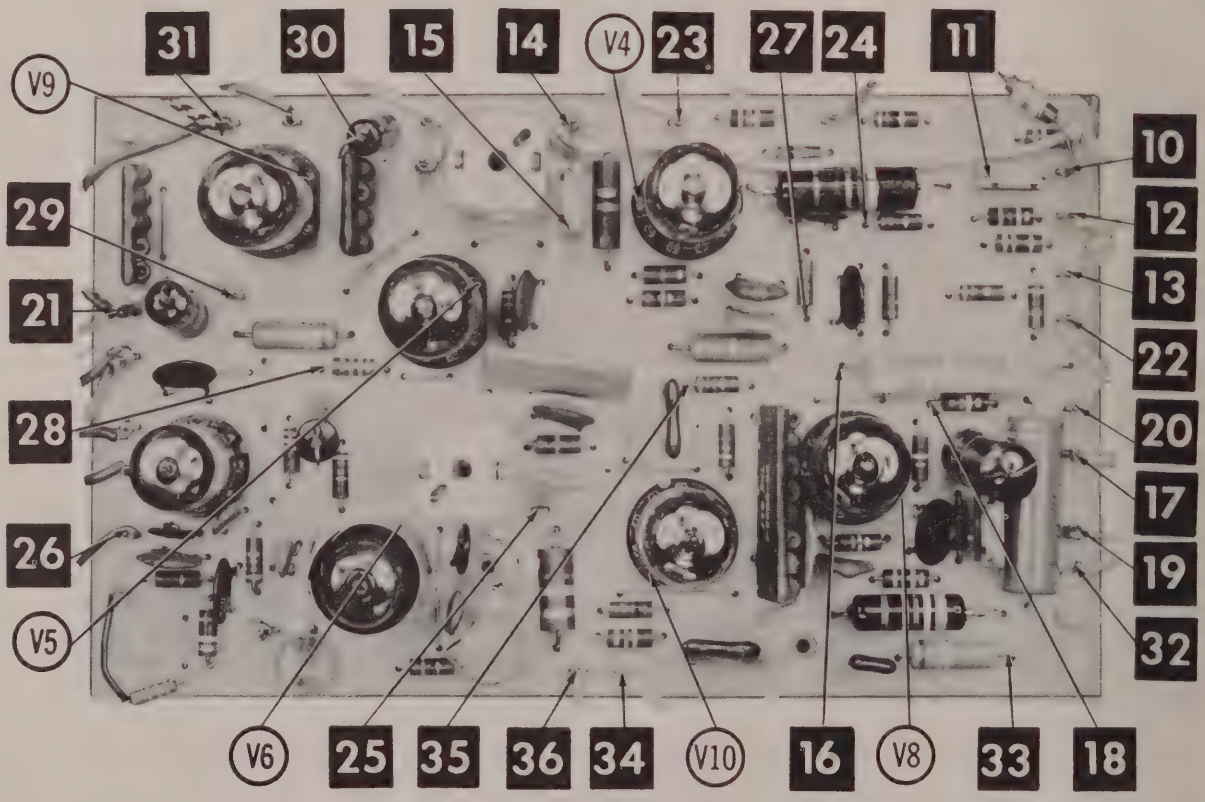
SYNC FAILURE
No vert. sync V8
No horiz. sync V8
No vert. or horiz. sync V8

PHILCO MODELS G4230E, G4642S, SL, G4646,
L, S, G4664P, UG4230E, UG4642S, SL, UG4646,
L, S, UG4664P (Ch. 9L41, U)

FOLDER 2



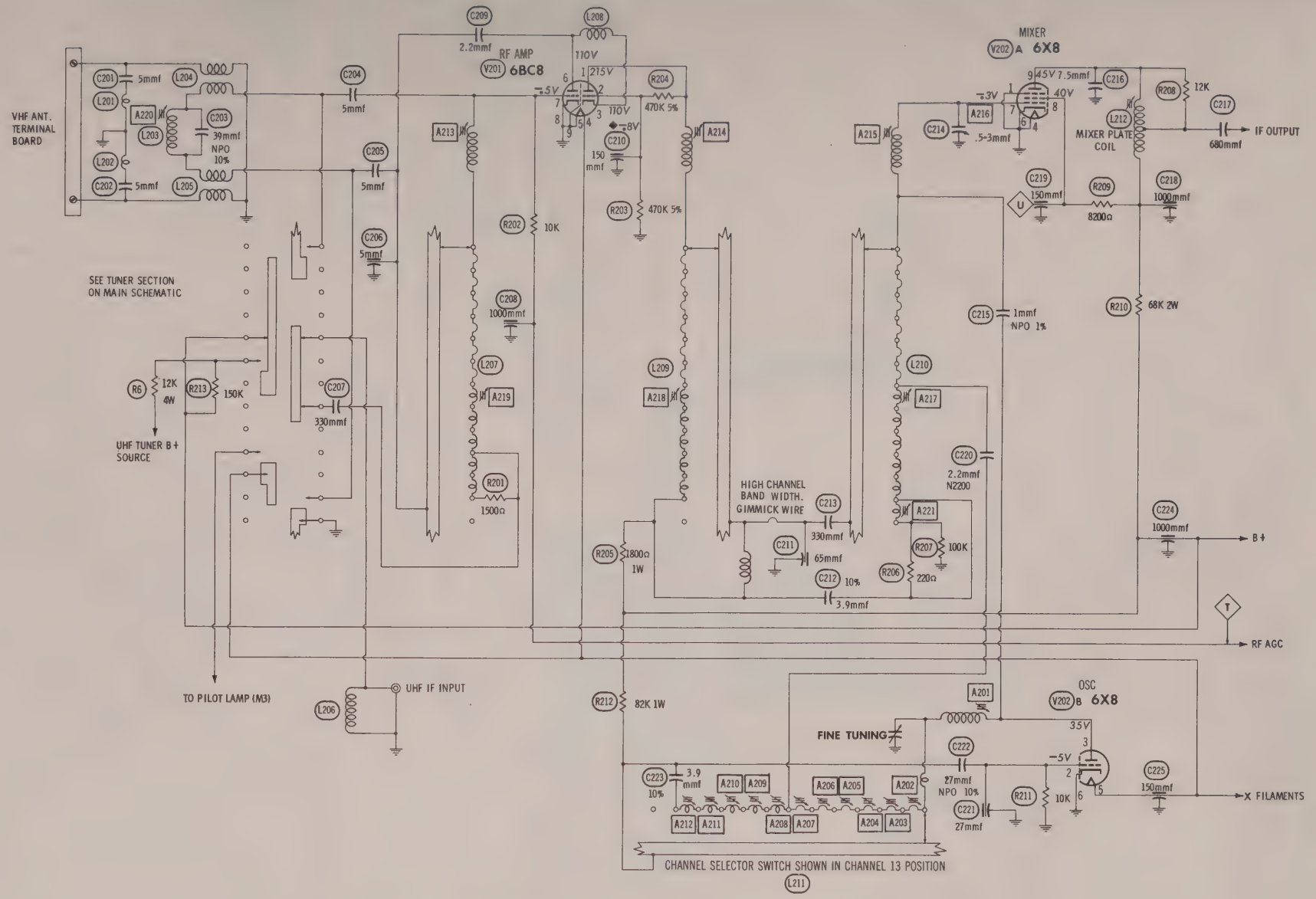
VIDEO IF - PRINTED BOARD



A Howard W. Sams CIRCUITRACE* Photo
*TRADE MARK

VIDEO, SOUND, SYNC & SWEEP - PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

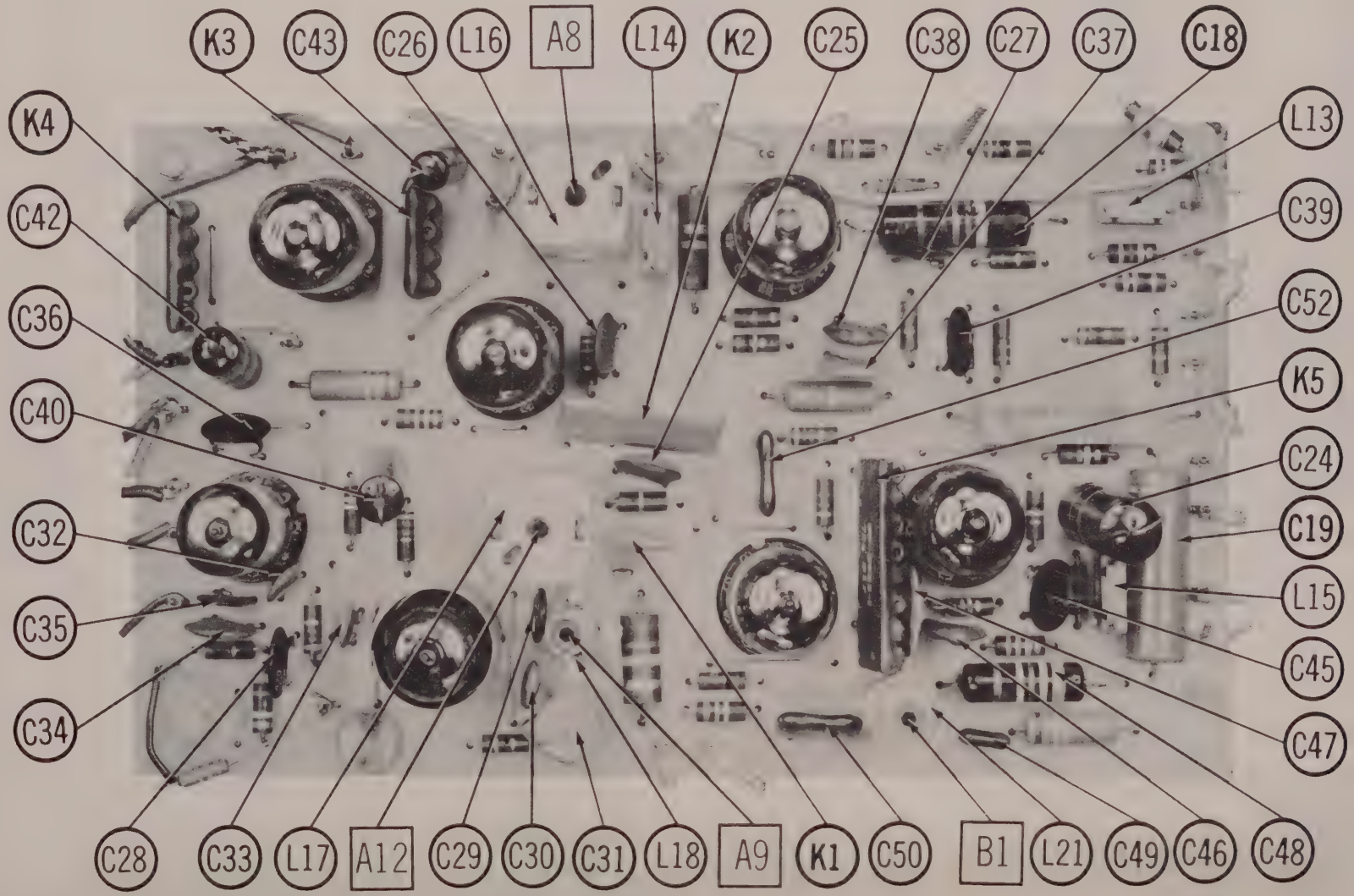


A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958

VHF TUNER WITH UHF PROVISIONS 76-11547-1 (T-69J)

PHILCO MODELS G4230E, G4642S, SL, G4646, L, S, G4664P, UG4230E, UG4642S, SL, UG4646, L, S, UG4664P (Ch. 9141, U)



VIDEO, SOUND, SYNC & SWEEP PRINTED BOARD - CAPACITOR, INDUCTOR & ALIGNMENT IDENT

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: Al thru A4 ..... General Cement #5004, 5008, or 5009
Walsco #2520
A5 thru Al2, & Mixer Plate Coil .... General Cement #8282, 8606, 8606L or 9295
Walsco #2543, 2544 or 2545

VIDEO IF ALIGNMENT

Connect the negative lead of a 4.5 volt bias supply to point Ⓐ . Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	Not used.	45.75MC (400∿ 30% AM Mod)	4	Vert. Amp. thru 10K to point Ⓑ . Low side to chassis. (Across video detector load).	Mixer Plate Coil	Use only enough generator output to provide a usable indication on VTVM. Adjust for maximum deflection.
2.	"	"	"	41.25MC (Crystal Accuracy)	"	"	Al	Increase generator output. Adjust for MINIMUM 400∿ indication.
3.	"	"	"	47.4MC (Crystal Accuracy)	"	"	A2, A3	Increase generator output. Adjust for MINIMUM 400∿ indication. Repeat steps 2 and 3.
4.	"	"	"	45.0MC	"	"	Mixer Plate Coil	Use only enough generator output to provide a usable indication on VTVM. Adjust for maximum 400∿ indication on scope.
5.	"	"	"	42.7MC	"	"	A4, A5	"
6.	"	"	"	45.75MC	"	"	A6	"
7.	"	"	"	43.85MC	"	"	A7	"
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	"	65.75MC	"	"	Fine Tuning	Adjust Fine Tuning for MINIMUM 400∿ indication on scope. DO NOT change Fine Tuning during balance of alignment.
9.	"	"	69MC (10MC Swp)	42.7MC 43.85MC 45.0MC 45.75MC	"	"		Check for response similar to Fig. 1. If necessary, retouch Mixer Plate Coil to set carrier level, A7 to adjust curve limit, A5 and A4 to adjust low frequency slope of curve and A6 to adjust high frequency side.

4.5MC TRAP ALIGNMENT

The detector used in alignment of the 4.5MC trap must first be padded by connecting to an accurate source of 4.5MC and a VTVM to the output.
Adjust the slug for maximum deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.005mfd	High side to point Ⓑ . Low side to chassis.	4.5MC (400∿ 30% AM Mod)	Any non-interfering channel	DC probe thru detector probe (Fig. 2) to cathode of picture tube (point Ⓒ). Common to chassis.	A8	Adjust for MINIMUM deflection.

SOUND IF ALIGNMENT

Tune in a weak station signal (antenna disconnected) and adjust for best picture. Do not change setting of Fine Tuning during balance of alignment.
Connect the antenna for a strong signal. Adjust A9 for maximum sound. Use peak furthest counterclockwise.
Disconnect antenna. Adjust A10, All and Al2 for maximum sound.
Connect antenna. Retouch A9 for maximum sound.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGES 6 & 15

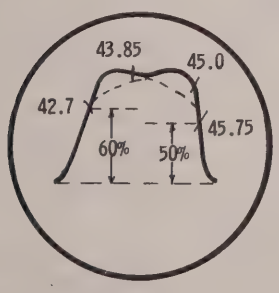


FIG. 1

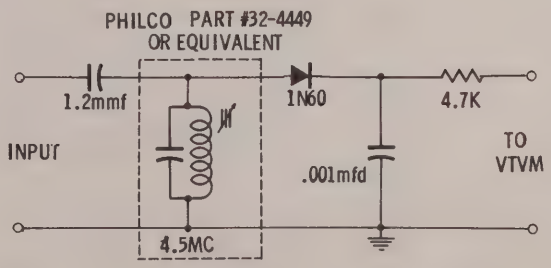


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	1st Video IF Amp	6DE6	
V2	2nd Video IF Amp	6DE6	
V3	3rd Video IF Amp. - Video Det	6AM8	
V4	Video Output-Noise Inv	6AW8A	
V5	Sound IF-AGC Clamper	6BY8	
V6	Audio Det	6CS6	
V7	Audio Output	6CA5	
V8	Sync Sep.-Horiz. AFC	12BH7	
V9	Vert. Mult.-Vert. Output	9CS7	
V10	Horiz Mult.	12AU7A	
V11	Horiz Output	6DQ6A	
V12	Damper	6DA4GT	
V13	HV Rectifier	1B3GT/ 1G3GT	
V14	LV Rectifier	5U4GB	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA: PHILCO PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No.	NOTES
V15	21DQP4			21DQP4 ‡	① "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	RATING: VOLT	PHILCO PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	350	30-2590-42	AFH4-57-93	D0477.5	FP333.65		Q-025	TVLS-4634.9*
B	80	350				TC78		MT-25100	
C	20	350							
D	100	200							
C2A	20	475	30-2417-59	PR8475/50	BR3050				TVLS-2719 *
B	100	50		V20/100	BR1005				

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	3		30-1263-38						N750 5%
C4	.5-3		31-6535-1		829-3		CT565A		
C5	.5-3		31-6535-1		829-3		CT565A		
C6	1-5		31-6535-2						
C7	.5-3		31-6535-1		829-3		CT565A		
C8	1500		30-1262-8	BPD-0015	DD-152	BYA1D15	B-215		5HK-D15
C9	680		30-1262-15	BPD-00068	DD-681	L10T68	B-368		5GA-T68
C10	470		30-1262-18		MD-471		JL-347		5GA-T47 10%
C11	1500		30-1262-8	BPD-0015	DD-152	BYA1D15	B-215		5HK-D15
C12	680		30-1262-15	BPD-00068	DD-681	L10T68	B-368		5GA-T68
C13	18		30-1263-3		DD-180	L10Q18	CNO-418		5GA-Q18 10%
C14	1000		30-1238-13	BPD-001	DD-102	BYA5D1	B-210		5HK-D1
C15	680		30-1262-15	BPD-00068	DD-681	L10T68	B-368		5GA-T68
C16	1500		30-1262-8	BPD-0015	DD-152	BYA1D15	B-215		5HK-D15
C17	5		30-1263	NPO-DI 5	DD-050	L10V5	CNO-547		5GA-V5
C18	.047	200	30-4650-45	P488N-047	DF-503	CUB4S47	GEM-4147		4TM-S47
C19	.15	200	30-4650-48	P288N-15		CUB2P15	GEM-2015		2TM-P15
C20	.22	200	30-4650-49	P288N-22		CUB2P22	GEM-2022		2TM-P22
C21	68		62-068409011	SI 68	D6-680	L76Q68			5GA-Q68
C22	.0047	200	30-4671-23	P368N-0047	DE-472	CUB4D47	GEM-6347		5GA-Q68
C23	.0047	200	30-4681-5				GEM-16347		5BF-D47 10%
C24	.1	400	30-4650-47	P488N-1	DF-104	CUB4P1	GEM-4Q1		4TM-P1
C25	6200		30-1263-4	BPD-00062			BL-362		BL-D80
C26	4700		30-1263-2	BPD-0047	DD-472	BYA1D47M	B-347		5HK-D47
C27	6200		30-1263-4	BPD-0062			B-362		BL-D80
C28	470		30-1263-19	BPD-00047	DD-471	L10T47	B-347		5GA-T47
C29	7.5		30-1263-39						N330
C30	1000		30-1263-11	BPD-001	DD-102	BYA5D1	B-210		5HK-DI
C31	.15	200	30-4650-48	P288N-15		CUB2P15	GEM-2015		2TM-P15
C32	1000		30-1263-11	BPD-001	DD-102	BYA5D1	B-210		5HK-DI
C33	470		30-1262-18	BPD-00047	DD-471	L10T47	B-347		5GA-T47
C34	6200		30-1263-4	BPD-00062			BL-362		BL-D80
C35	68			BPD-000068	DD-680	L10Q68	CNO-468		5GA-Q68 ①
C36	6200		30-1263-1	BPD-0062			B-362		BL-D80
C37	2200		30-1263-7	BPD-0022	DD-222	BYA1D22	B-322		5HK-D22
C38	4700		30-1263-2	BPD-0047	DD-472	BYA1D47M	B-347		5HK-D47
C39	470			BPD-00047	DD-471	L10T47	B-347		5GA-T47 ②
C40	.022	400	30-4651-22						5BF-S22 10%
C41	.22	100	30-4681-6	P288N-22		CUB2P22	GEM-3022		2TM-P22
C42	.033	400	30-4650-44	P488N-033		CUB6S33	GEM-4133		6TM-S33
C43	.001	1000	30-4650-56	P088N-001		CUB1D2	GEM-1021		1DTM-D
C44	4.7		30-1221-13	NPO-SI 4.7	TCZ-4R7	CTA5V47C	ZT-5547		5TCCB-V47 10%
C45	68		30-1263-7	BPD-000068	DD-680	L10Q68	CNO-468		5GA-Q68
C46	270		30-1263-48	DI 270	MD-271	L10T27			5GA-T27 10%
C47	18000		30-1263-26						5BF-D39 10%
C48	.0039	200	30-4651-25						MS-468 10%
C49	68		30-1264-14	1469-000068	DD-680	22R5Q68			MS-339 10%
C50	390		30-1264-1	1469-00039	MD-391	5R5T39			MS-339 10%
C51	470		30-1238-10	BPD-00047	DD-471	L10T47	B-347		5GA-T47
C52	390		30-1264-1	1469-00039	MD-391	5R5T39			MS-339 10%
C53	.047	400	30-4650-45	P488N-047	DF-503	CUB4S47	GEM-4147		4TM-S47
C54	.047	600	30-4650-62	P688N-047	DF-503	CUB6S47	GEM-6147		6TM-S47
C55	1500		30-1262-8	BPD-0015	DD-152	BYA1D15	B-215		5HK-D15

① Some versions may use 27mmf (Part #30-1263-23) or 47mmf (Part #30-1263-41) in this application.
② Some versions may use 180mmf in this application.

CONTROLS

ITEM No	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	15K	½	33-5592-35					Contrast, Tap ⑤ 12K
B	2.5meg	½						Volume
C	Switch							Push-Push Type
R2A	100K	½	33-5593-1	F1-31 †			FB15L	Brightness
B	Shaft			Not Req		●● (GJ-959	GS87S	
R3A	40K	½	33-5593-16	F1-39 †		●● (GJ-976	FB54L	Vert. Hold
B	Shaft			Not Req.			GS87S	
R4A	30K	½	33-5592-5	F1-28 †		■▲ (GJ-957	▲▲(UE378)	Horiz. Hold
B	250K	½		R2-34 †				Horiz. Range
R5A	6000Ω	½	33-5592-29	F1-9 †		■♦ (GJ-977	♦♦(UE389	Vert. Lin.
B	4.3meg	½		R2-83 †				Height

† Saw off shaft, and slot before assembly.
■ Not available as a factory assembled control.
● "Concentrikit" Equivalent: K-6 Kit, Base Element & Shaft Bil-128, P17-028 .
● "Concentrikit" Equivalent: K-6 Kit, Base Element & Shaft Bil-123, P17-028.
▲ "Concentrikit" Equivalent: K-6 Kit, Base Elements & Shafts Bil-121, P17-028 Panel Bil-130, R15-005 Rear

▲▲ "STA-LOC" Equivalent: FA341, O8875, RU2541, 12875.
‖ "Concentrikit" Equivalent: K-6 Kit, Base Elements & Shafts Bil-115, P17-028 Panel Bil-141, R15-003 Rear

♦♦ "STA-LOC" Equivalent: FA63L, O8887, RU561, 12437.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING: OHMS	RATING: WATT	PHILCO PART No.	NOTES
R6	12K	4	33-1363-11	
R7	270K		66-4278340	
R8	3.3meg		66-5338340	
R9	2.2meg		66-5228340	
R10	1000Ω		66-2208340	
R11	22K		66-2228340	
R12	330Ω		66-1338340	
R13	47Ω		66-0478340	
R14	27K		66-2278340	
R15	1000Ω		66-2208340	
R16	330Ω		66-1338340	
R17	68Ω		66-0688340	
R18	18K		66-3188340	
R19	1000Ω		66-2208340	
R20	220Ω		66-1228340	
R21	3900Ω		66-2398340	
R22	470K		66-4478340	
R23	470K		66-4478340	
R24	5600Ω		66-2568340	
R25	82Ω		66-0828340	
R26	6800Ω		66-2688340	
R27	180K		66-4188340	
R28	220K		66-4228340	
R29	1.5meg	1	66-5158340	
R30	15K		66-3158340	
R31	330Ω		66-1338340	
R32	1000Ω		66-2208340	
R33	7.5meg 5%		66-5758240	
R34	470K		66-4478340	
R35	2200Ω		66-2228340	
R36	12K	2	66-3125340	
R37	6200Ω		66-2628340	
R38	360Ω 5%		66-1668240	
R39	1meg		66-5108340	
R40	820K		66-4828340	
R41	68Ω		66-0688340	
R42	2.2meg		66-5228340	
R43	20K 5%		66-3208240	
R44	2200Ω	1	66-2228340	
R45	5600Ω	7	33-1335-140	
R46	2700Ω 5%		66-2278240	Note 1
R47	22K 5%	1	66-3224240	
R48	220K		66-4228340	Note 2
R49	1.2meg 5%		66-5128240	
R50	8.2meg 5%		66-5828240	
R51	680 K		66-4688340	
R52	150K		66-4158340	
R53	13K 5%		66-3138240	
R54	68K	1	66-3684340	
R55	20K 5%		66-3208240	
R56	390Ω		66-1398340	
R57	390Ω		66-1398340	
R58	680K		66-4688340	
R59	390K		66-4398340	
R60	15K	1	66-3154340	
R61	1200Ω		66-2128340	
R62	68K		66-3688340	
R63	8200Ω		66-2828340	
R64	1meg		66-5108340	
R65	10K	1	66-3104340	
R66	8200Ω	4	66-2828340	Note 3
R67	4700Ω	4	33-1363-18	
R68	2200Ω		66-2228340	
R69	24K	4	33-1365-144	
R70	3300Ω		66-2338340	
R71	470K		66-4478340	

Note 1. Some versions may use 2200Ω 5% in this application (Part #66-2228240).
Note 2. Some versions may use 680K in this application (Part #66-4688340).
Note 3. Some versions may use 10K 3W in this application (Part #33-1363-25).

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Rem PART No.	NOTES
L1	47.25MC Trap Coil	32-4645-3	19-1001	BC-562	4604		
L2	47.25MC Trap Coil	32-4645-19	19-1003	BC-563	4606		
L3	41.25MC Trap Coil	32-4645-34					
L4	RF Choke	32-4645-20	19-1000	BC-561	4602		1.1 Microhenries
L5	1st Video IF	32-4645-2					
L6	Fil. Choke	32-4645-35					
L7	2nd Video IF	32-4686-2					
L8	3rd Video IF,	32-4686-2					
L9	4th Video IF	32-4686-3					
L10	Resonant Choke	32-4645-7					3 Microhenries
L11	RF Choke	32-4674-1					22 Microhenries
L12	Resonant Choke	32-4674-1					22 Microhenries
L13	Shunt Peaking Coil	32-4762-12	19-3500	TV-203	6136	VP-8	470 Microhenries
L14	Shunt Peaking Coil	32-4762-9	19-3275	TV-198	6130	VP-6	270 Microhenries
L15	Series Peaking Coil	32-4762-10	19-3350	TV-200	6132	VP-7	330 Microhenries
L16	1st Sound IF	32-4686-6					Includes 4.5MC Trap
L17	2nd Sound IF	32-4745-2					
L18	Quadrature Coil	32-4644-14					
L19	RF Choke	32-4113-80	19-1005	BC-566	4632		11 Microhenries, wound on 22Ω 1W resistor
L20	RF Choke	†					† Part of T4.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: PHILCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Rem PART No.	Thordarson PART No.	NOTES
L21	150Ω		32-4754-3						

FILTER CHOKE

ITEM No.	RATINGS: CURRENT (Measured)	RATINGS: DC RES.	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: PHILCO PART No	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
L22	.225A	41Ω	1.3 Hy.	32-8710-3 ①		C-2974	F-803		26C44	C-23X

① Alternate Part No. 32-8710-7.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	REPLACEMENT DATA: PHILCO PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⑪1.5A	540VCT ⑫.225A	5V ⑫ 3A	32-8807-2						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V &.6.2A									

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No	Halldorson PART No	Merit PART No.	Rem PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No	Triad PART No
T2	Vert. Output	32-8814-1	Z1807 ①	A-2824 ①	V31J		VO-101 ②	26S52	A-102X
T3	Yoke-Horiz. (20MH) (90°)-Vert. (48MH) Centering Device & Yoke Clamp	76-1019-5	DF807 ③	MDF-92 ③	Y90F19/43 ③	PCM3045 ③	DY-16A ③	Y-16 ③	Y-4J ③
T4	Horiz. Output	76-1059-2 32-8806-2 ④							

① Cut and tape blanking lead.
② Drill new mounting hole(s).
③ Use original damping network, original centering device, yoke plug and leads. Connect same as original.
④ Includes L20.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: PHILCO PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	4300Ω	3-4Ω	32-8862-1	Z1001	A-2930	AU-601	A-3877	24S51	S-3X	

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: PHILCO PART No.	QUAM PART No.	NOTES
SP1	6"	PM	10Ω	36-1680-2 ①	6A2I210 ①	① Parallel and phase.
SP2	5"	PM	9Ω	36-1669-10 ①	52A2I29 ①	
SP3	5"	PM	9Ω	36-1669-10 ①	52A2I29 ①	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	PHILCO PART No.	REPLACEMENT DATA	
K1	Audio Det. Grid Filter	150mmf, 15K	30-8031-1	Sprague	AC15-5
K2	Vert. Integrator	150mmf, 4000mmf, 4000mmf, 5000mmf, 33K, 33K, 90K	30-8030-2	Sprague	V-10
K3	Vert. Feedback	1000mmf, 2000mmf, 47K, 100K	30-8514-1		
K4	Vert. Output & Blanking	5000mmf, 8000mmf, 1meg, 2.2meg, 10K	30-8523-1		
K5	Horiz. Circuitry	1000mmf, 1000mmf, 1500mmf, 2200mmf, 8200Ω, 39K, 220K, 4.7meg	30-8523-1		

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: PHILCO PART No.: FUSE	PHILCO PART No.: HOLDER	LITTELFUSE PART No.: FUSE	LITTELFUSE PART No.: HOLDER	BUSS PART No.: FUSE	BUSS PART No.: HOLDER
M1	N	7/10A 250V S/B	27-6318-1	27-6317-5	333.600 (N 6/10A 125V S/B	346010	N 7/10	HN 1/2 to 3/4

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M2	Lamp	34-2031-4	#1847
M3	Lamp	34-2031-13	#1847
M4	Tuner	76-11547-7	VHF With UHF Provisions (T-6U) Ch. 9L41U
	Tuner	76-10518-1	VHF (T-6BB-2) Ch. 9L41
M5	Tuner		UHF (T-27A) Ch. 9L41U
M6	Switch	42-2075-4	Fringe-Normal, DPDT, Slide Type
M7	Switch	42-2075-1	Width, SPST, Slide Type
M8	Magnet	76-11069-2	Beam Alignment
	Magnet	76-8077-7	Focus, (Used on some versions)
	Printed Board	54-9926	Video IF
	Printed Board	54-8792	Video, Sound, Sync, Sweep

CABINETS & CABINET PARTS

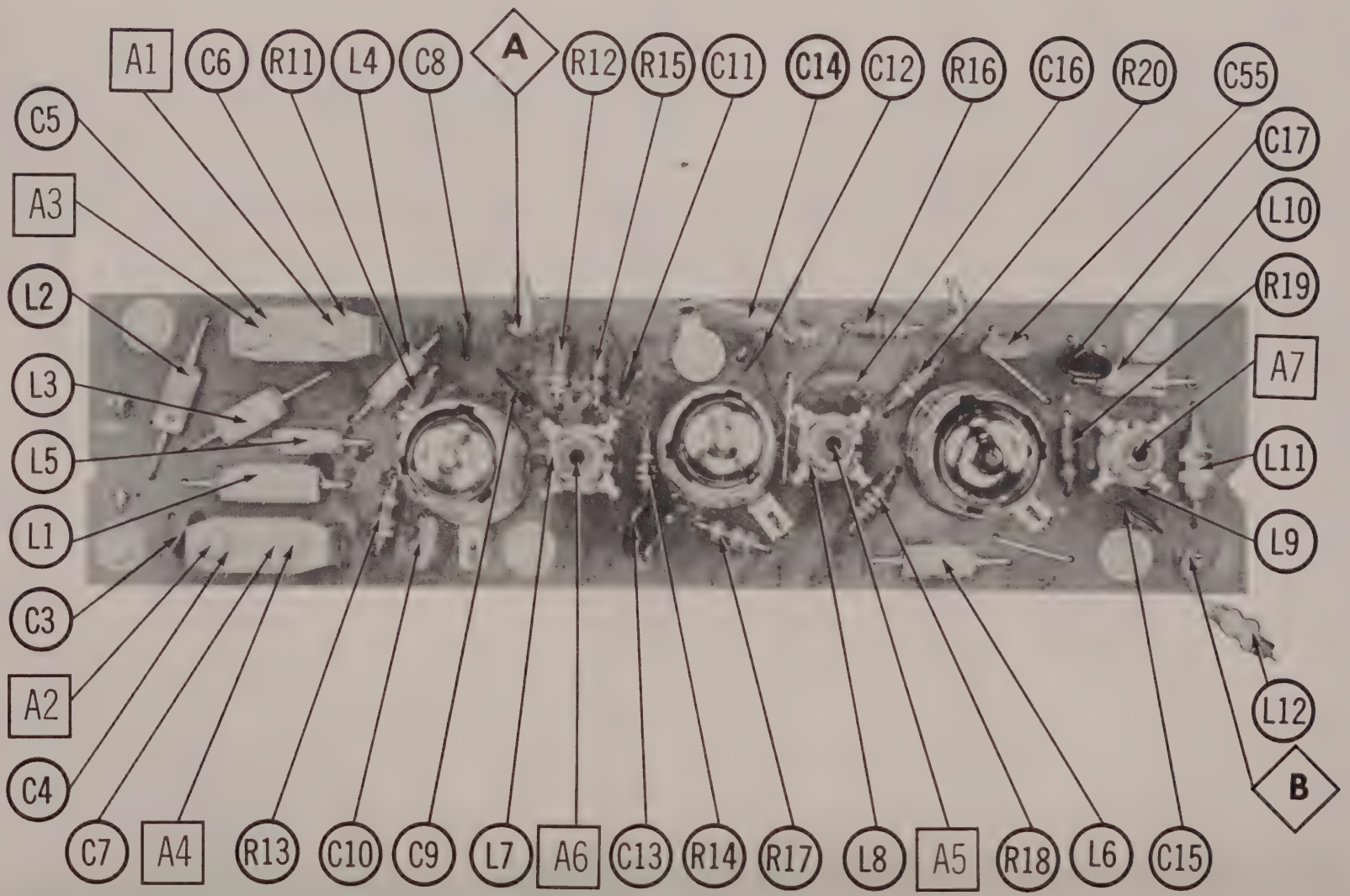
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

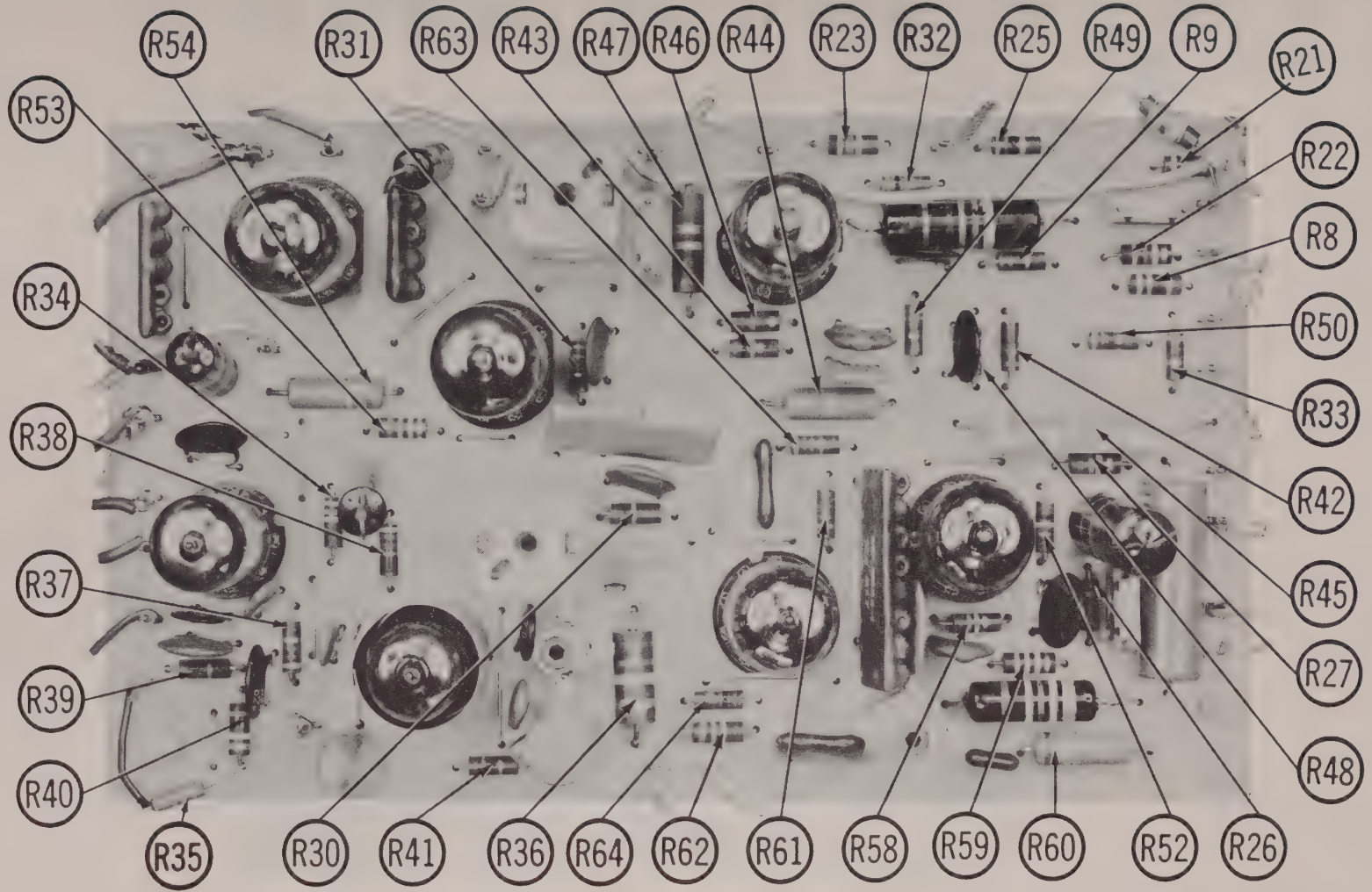
High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8685 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8534 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8674
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8464 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 6 Conductor

PHILCO MODELS G4230E, G4642S, 5L, G4646, L, 5, G4646P, UG4230E, UG4642S, 5L, UG4646, L, 5, UG4646P (Ch. 9141 U)

FOLDER 2

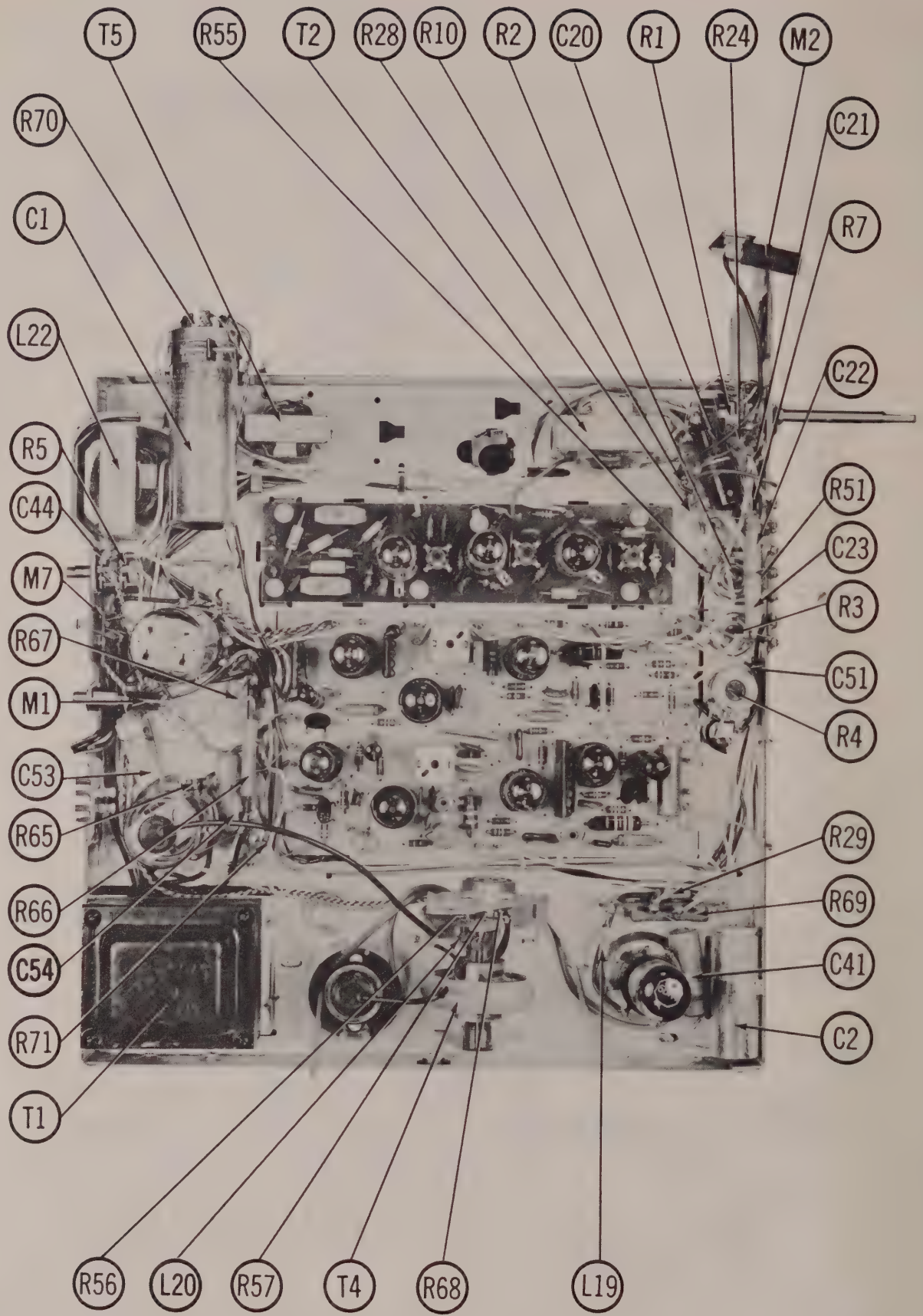


VIDEO IF - PRINTED BOARD



VIDEO, SOUND, SYNC & SWEEP PRINTED BOARD - RESISTOR IDENTIFICATION

PHILCO MODELS G4230E, G4642S, SL, G4646,
L, S, G4664P, UG4230E, UG4642S, SL, UG4646,
L, S, UG4664P (Ch. 9L41, U)



CHASSIS TOP VIEW

TUNER ALIGNMENT INSTRUCTIONS (cont)

UHF IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	1500mmf Ceramic Capacitor	High side to point ⟨V⟩ Low side to chassis.	Not used	43.5MC (400∿ 30% AM Mod)	UHF	Vert. Amp. thru 10K to point ⟨U⟩. Low side to chassis.	A22l	Adjust for flat symmetrical response.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

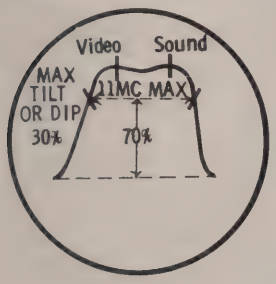
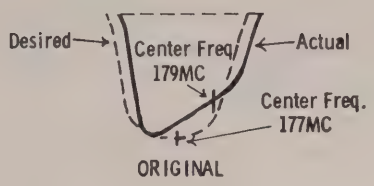


FIG.201



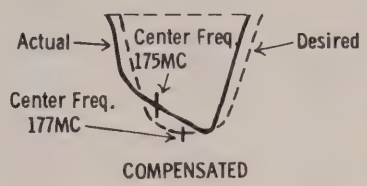


FIG.202

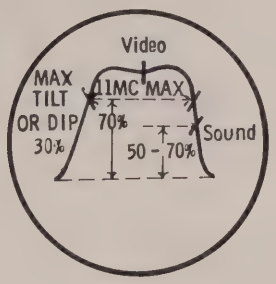
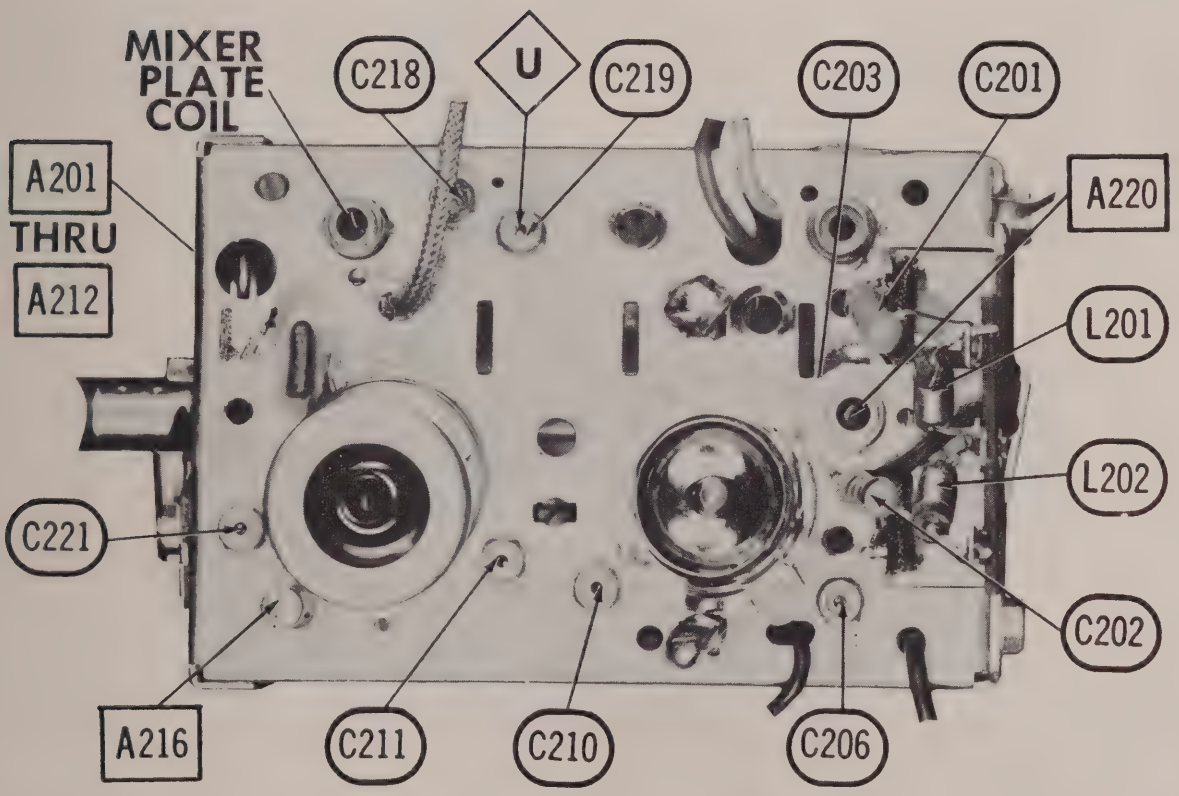


FIG. 203



TUNER 76-11547-1 (T-69J) —TOP VIEW

TUNER PARTS LIST AND DESCRIPTIONS

76-11547-1 (T-69J)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BC8	
V202	Mixer-Osc.	6X8	

ITEM No.	USE	TYPE	NOTES
V203	UHF Osc.	6AF4A	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	5		30-1224-78	SI 5	D6-050	LT6V5	ZT-555	5GA-V5	
C202	5		30-1224-78	SI 5	D6-050	LT6V5	ZT-555	5GA-V5	
C203	39		30-1251-26	NPO-DI 39	DTZ-39	C10Q39C	CNO-439	5TCC-Q39	NPO 10%
C204	5		30-1224-78	SI 5	D6-050	LT6V5	ZT-555	5GA-V5	
C205	5		30-1224-78	SI 5	D6-050	LT6V5	ZT-555	5GA-V5	
C206	5		30-1268-1						
C207	330		30-1265-2	BPD-00033	DD-331	LI0T33	B-333	5GA-T33	
C208	1000		30-1268-7	EF-001	MFT-1000			503C-DI	
C209	2.2		30-1221-6	NPO-SI 2.2	TCZ-2R2	CTA6V22C		5TCCB-V22	
C210	150		30-1268-6						
C211	65		30-1268-2						
C212	3.9		30-1221-14						10%
C213	330		30-1265-2	BPD-00033	DD-331	LI0T33	B-333	5GA-T33	
C214	.5-3		31-6520-3		829-3		CT565A		
C215	1.0		30-1224-82						NPO 1%
C216	7.5		30-1251-19						
C217	680		62-168001011	SI 680	D6-681	LT6T68	UC-5368	5GA-T68	
C218	1000		30-1268-7	EF-001	MFT-1000			503C-DI	
C219	150		30-1268-6						
C220	2.2		30-1224-143						N2200
C221	27		30-1268-4						
C222	27		30-1224-146	NPO-SI 27	TCZ-27	CTA6Q27C		5TCC-Q27	NPO 10%
C223	3.9		30-1221-14						10%
C224	1000		30-1268-7	EF-001	MFT-1000			503C-DI	
C225	150		30-1268-6						
C226	.68		30-1221-11	NPO-SI .68	TCZ-R68				10%
C227	30		76-10170						
C228	1.0		30-1224-107						N1500 1%
C229	.5-3		31-6520-1		829-3		CT565A		
C230	.75		30-1224-108						N1500 1%
C231	250		30-1261						
C232	1000		30-1258	EF-001	MFT-1000			503C-DI	
C233	1000		30-1258	EF-001	MFT-1000			503C-DI	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R201	1500Ω		66-2158340	
R202	10K		66-3108340	
R203	470K 5%		66-4478240	
R204	470K 5%		66-4478240	
R205	1800Ω	1	66-2184340	
R206	220Ω		66-1228340	
R207	100K		66-4108340	
R208	12K		66-3128340	

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R209	8200Ω		66-2828340	
R210	68K	2	66-3685340	
R211	10K		66-3108340	
R212	82K	1	66-3824340	
R213	150K		66-4158340	
R214	470K		66-4478340	
R215	5600Ω		66-2568340	

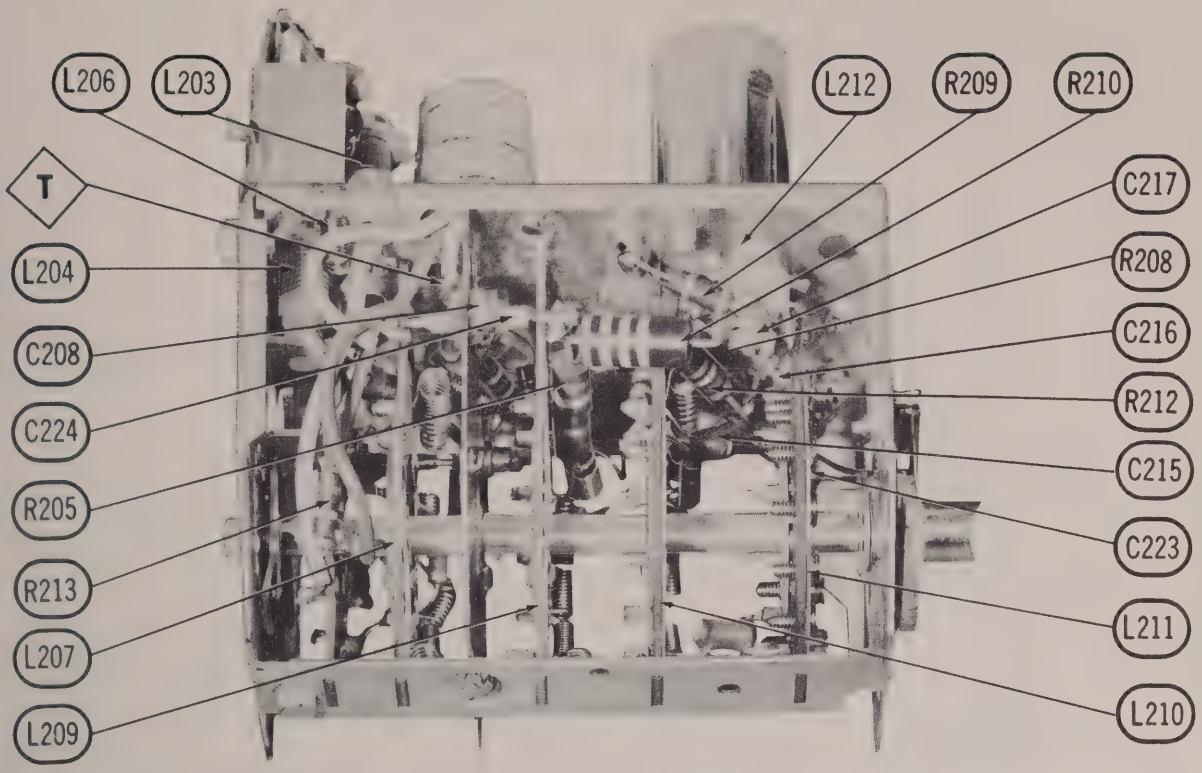
COILS (RF-IF)

ITEM No.	USE	PHILCO PART No.	NOTES
L201	IF Trap Coil	32-4645-31	
L202	IF Trap Coil	32-4645-31	
L203	IF Trap Coil	32-4719-2	
L204	VHF Ant. Trans.	32-4725	
L205	VHF Ant. Trans.	32-4725	
L206	RF Choke	32-4726-10	
L207	Ant. Coils	76-10112	Channel 2-13, Includes wafer assy.
L208	RF Choke	32-4652-41	
L209	RF Coils	328-0116	Channel 2-13, Includes wafer assy.

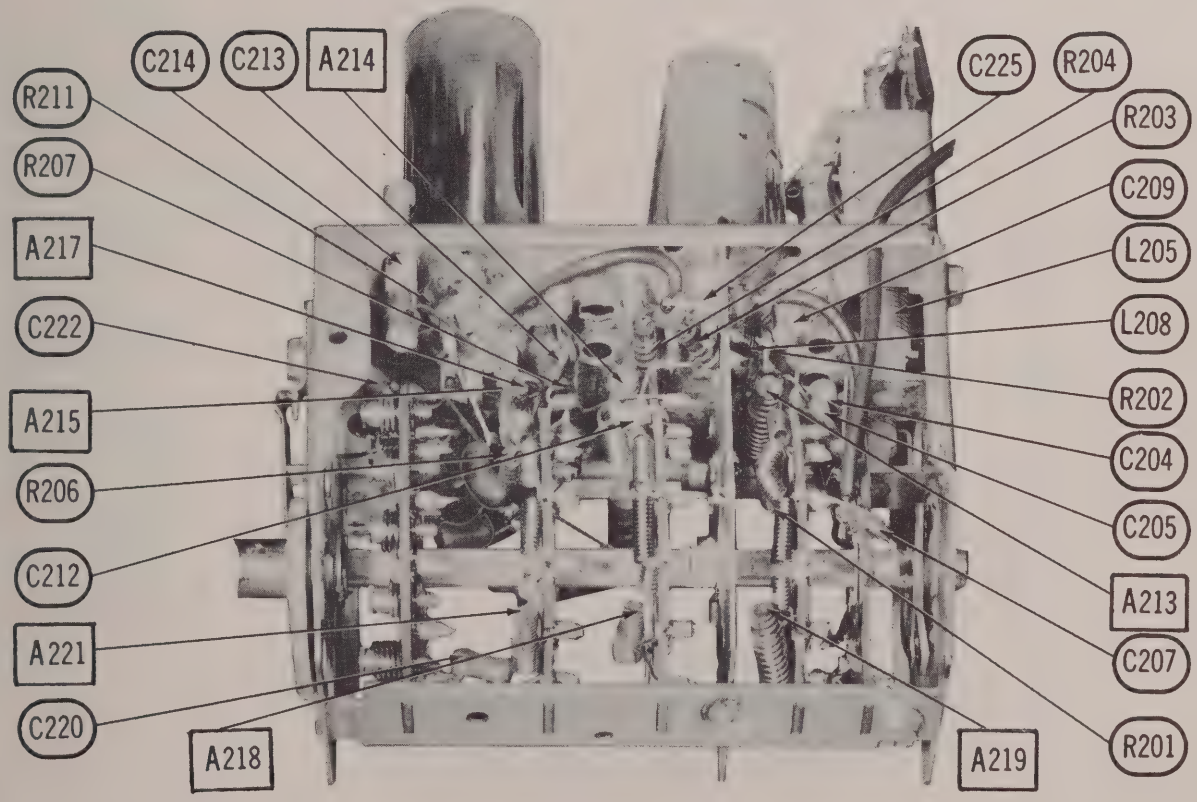
ITEM No.	USE	PHILCO PART No.	NOTES
L210	Mixer Grid Coils	76-10110	Channel 2-13, Includes wafer assy.
L211	Osc. Coils	328-0113	Channel 2-13, Includes wafer assy.
L212	Mixer Plate Coil	32-4629-4	
L213	UHF Ant. Coil	76-10072	Includes R215, C209 & panel assy.
L214	RF Choke	76-10170	Includes panel assy.
L215	Cathode Choke	32-4642-4	
L216	Fil. Choke	32-4652-44	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		PHILCO PART No.	CBS PART No.	SYLVANIA PART No.	
M201	1N82A *	34-8033	1N82A	1N82A	UHF Mixer (Clip-in) * Some versions may use 1N173A in this application.



TUNER 76-11547-1 (T-69J) - LEFT SIDE



TUNER 76-11547-1 (T-69J) - RIGHT SIDE

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6DE6	470K	47Ω	0Ω	.1Ω	††730Ω	††730Ω	0Ω		
V2	6DE6	470K	68Ω	0Ω	.1Ω	††400Ω	††400Ω	0Ω		
V3	6AM8	220Ω	.1Ω	††1000Ω	.1Ω	0Ω	††1000Ω	.1Ω	3900Ω	0Ω
V4	6AW8A	2500Ω	4.5meg	†27K	.1Ω	0Ω	82Ω	470K	††68Ω	†7800Ω
V5	6BY8	5.2Ω	0Ω	0Ω	0Ω	.1Ω	1.4meg	††15K	††15K	330Ω
V6	6CS6	15K	360Ω	0Ω	.1Ω	†340K	††6700Ω	5Ω		
V7	6CA5	¶	500K	0Ω	.1Ω	500K	†0Ω	†270Ω		
V8	12BR7	†50K	2.4meg	0Ω	0Ω	0Ω	0Ω	1.1meg	390K	.1Ω
V9	6CS7	‡5700Ω	NC	2.2meg	.1Ω	0Ω	• ‡3.5meg	100K	• 30K	• 1300Ω
V10	12AU7A	†18K	5.9meg	1200Ω	0Ω	0Ω	†50K	• 100K	1200Ω	.1Ω
V11	6DQ6A	TP	.1Ω	NC	†18K	1meg	NC	0Ω	0Ω	TOP CAP †42.6Ω
V12	6DA4GT	NC	NC	¶100K	NC	†2Ω	NC	.1Ω	0Ω	
V13	1B3GT/ 1G3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP ‡372Ω
V14	5U4GB	NC	¶	NC	36Ω	NC	38Ω	NC	¶	
V15	21DQP4	0Ω	1meg	Pin 6 1meg	Pin 10 ‡4700Ω	Pin 11 • 210K	Pin 12 .1Ω			
V201	6BC8	†2800Ω	230K	INF	.1Ω	0Ω	INF	220K	0Ω	0Ω
V202	6X8	0Ω	10K	†83K	0Ω	.1Ω	0Ω	100K	†77K	†68K
V203	6AF4A	*†13K	*5600Ω	.2Ω	.1Ω	*.1Ω	*5600Ω	*†13K		
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.

* MEASURED IN "UHF" POSITION.

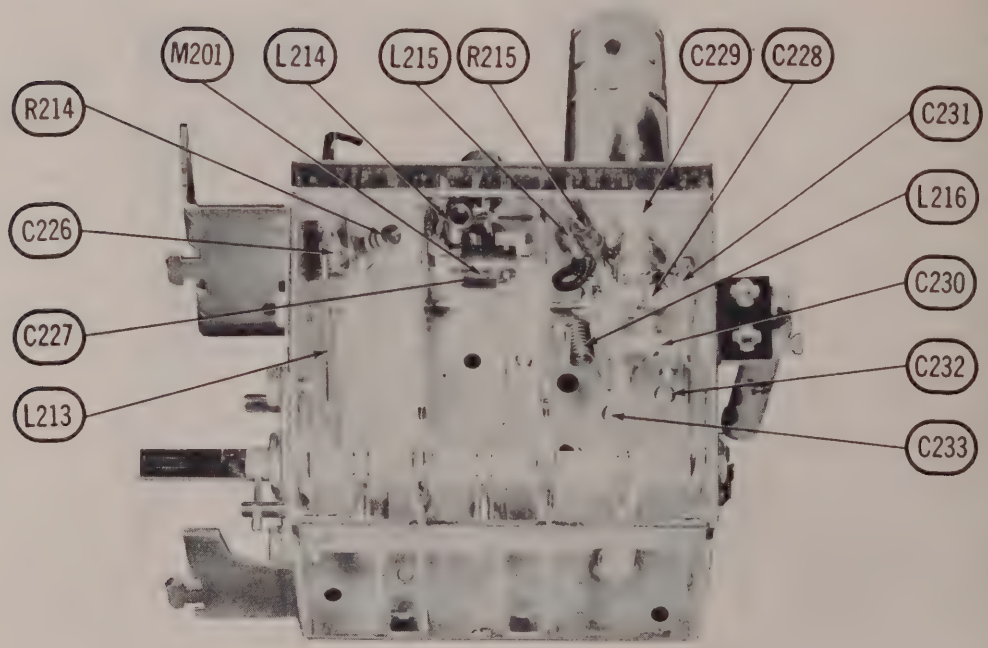
† MEASURED FROM 260V SOURCE.

†† MEASURED FROM 140V SOURCE.

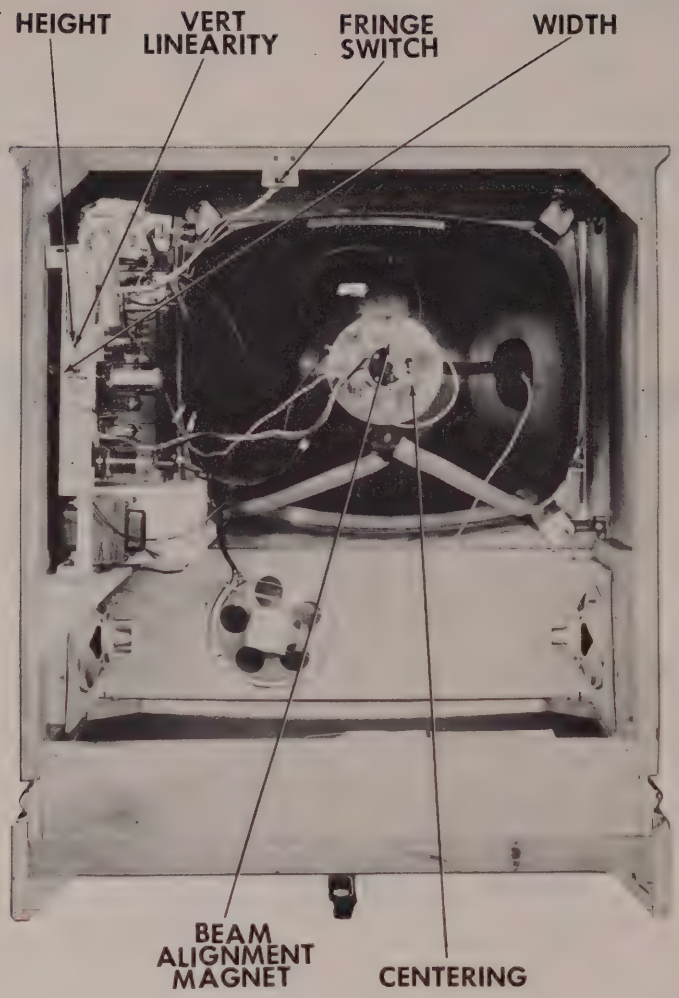
‡ MEASURED FROM PIN 3 OF V12.

NC NO CONNECTION

TP TIE POINT



UHF TUNER T-27A



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a station signal. Allow the receiver to warm up. Connect a clip lead across the Horizontal Frequency coil (L21).

Set the Horizontal Hold to the center of its range.

Adjust the Horizontal Range (R4B) until the picture appears to float back and forth across the screen.

Remove the clip lead from across L21 and adjust the Horizontal Frequency slug (B1) until the picture synchronizes horizontally.

PHOTOFACT* Folder

with CIRCUITRACE*

SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A (Ch. 528.51400, 401, 410, 411, 528.531901)

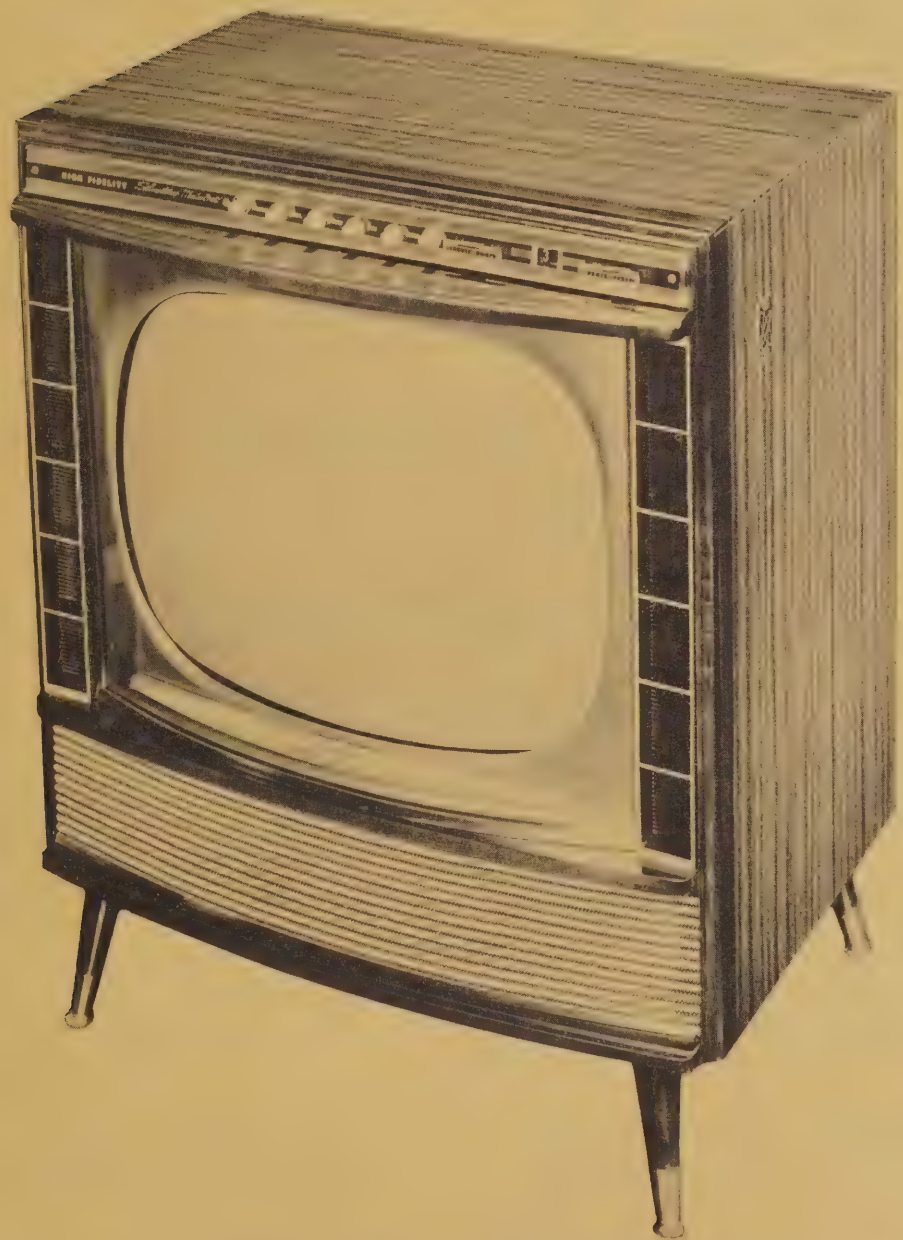
IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A (Ch. 528.51400, 401, 410, 411, 528.531901)

SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A (Ch. 528.51400, 401, 410, 411, 528.531901)



MODEL 9160 (CH.528.51400)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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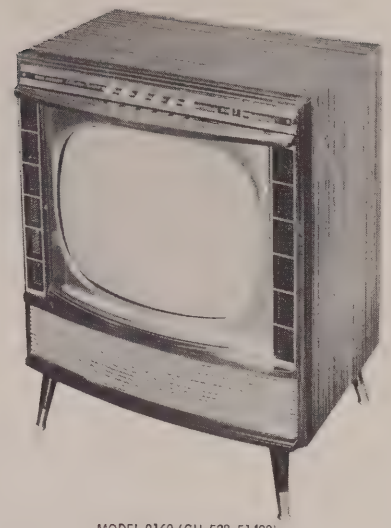
SET 423 FOLDER 3

SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A (Ch. 528.51400, 401, 410, 411, 528.531901)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 8 push-on type knobs from the front.
2. Remove 10 wood screws holding rear cover. Remove rear cover.
3. Remove picture tube socket, yoke plug, power tuning plug, electrostatic speaker plug, speaker leads, HV lead, and 2 picture tube ground straps.
4. Remove 2 wood screws holding rear control panel bracket.
5. Remove 3 metal screws holding front control escutcheon. Remove escutcheon.
6. Remove 4 metal screws holding On-Off switch and power tuning switch.
7. Remove 2 hex nuts holding control bracket (inside front). Remove control bracket.
8. Remove 2 wood screws holding tuner mounting bracket at top rear. Remove tuner.
9. Remove 2 top and 2 bottom chassis bolts.
10. Remove chassis.



MODEL 9160 (CH.528.51400)

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS

TRADE NAME	Silvertone	MODELS	CHASSIS
		9160, 9162, 9184, 9186, 9188, 9189	528.51400
		9160, 9162, 9184, 9186, 9188, 9189	528.51401
		9161, 9163, 9185, 9187	528.51410
		9161, 9163, 9185, 9187	528.51411
		Radio 7777A	528.531901

SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Avenue, Chicago, Illinois
TYPE SET	Television Receiver
TUBES	Sixteen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 150 Watts, 1.45 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the rear cover, and supplying power to the receiver. Set the Fine Tuning at the center of its range. The adjustments (located in a circle around the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 13 adjustment is located at 4 o'clock, proceed in a counterclockwise direction adjusting for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 5 wood screws holding metal trim at top of safety glass.
Tilt glass out at the top and lift to remove.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heared in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. Focus
The focus may be varied by means of a Focus control. (For location, see tube placement chart.)

C. Width
The width may be varied by means of a metallic sleeve located between the Yoke and the Picture Tube neck. Adjust sleeve in or out of the yoke for a picture slightly larger than necessary to fill the screen.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Oscillator coil is used as the Horizontal Hold control. Adjust the Horizontal Hold until the picture synchronizes horizontally. (For location, see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Ratio Detector secondary (A10) located on top of chassis.

FUSE DEVICE

A Circuit Breaker is used for LV power supply protection, and may be reset by depressing the reset button. (For location, see tube placement chart.)

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

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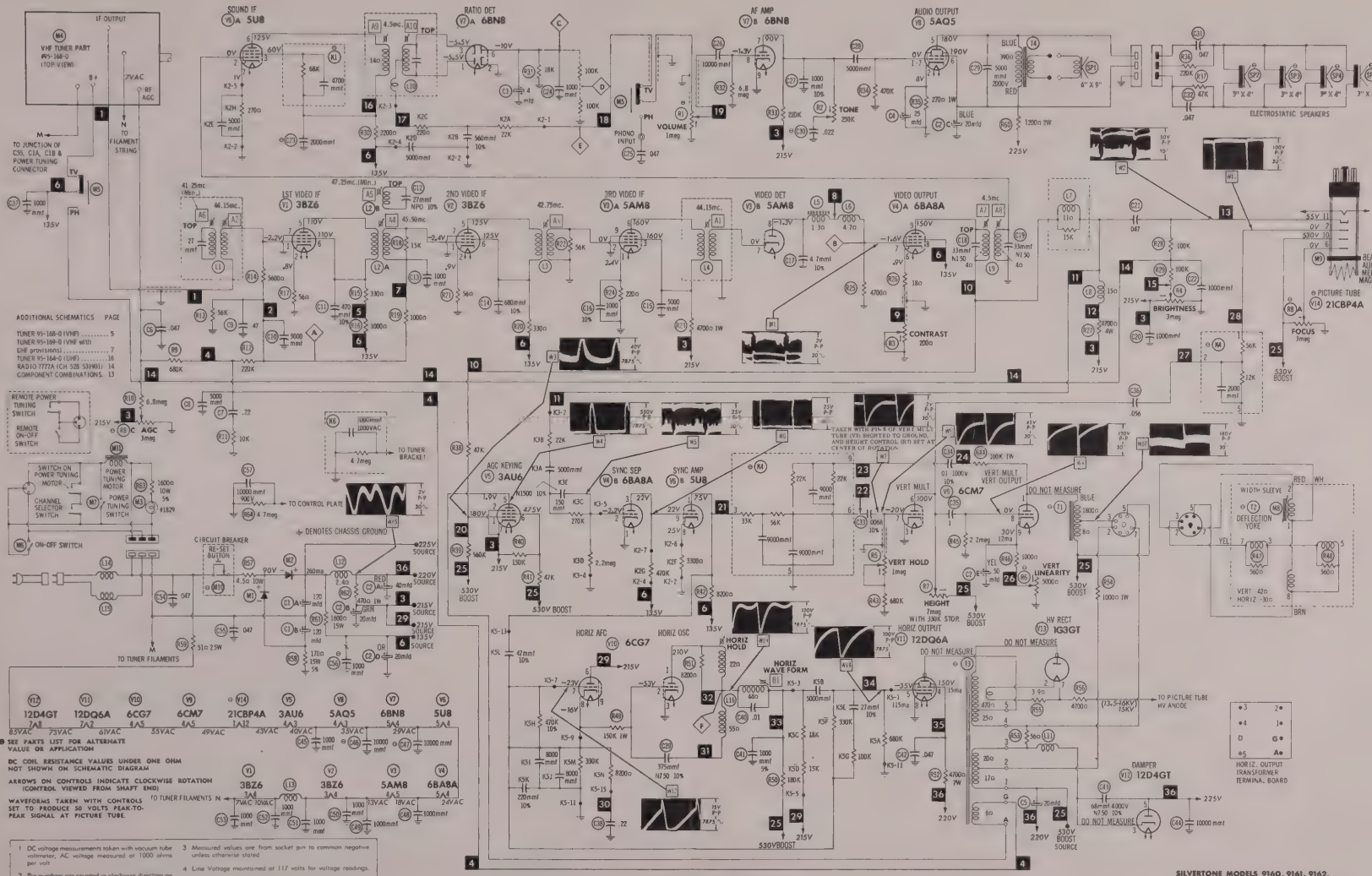
H877

SET 423 FOLDER 3


SOUND IF V6 A 5U8
RATIO DET V7 A 6BN8
AF AMP V7 B 6BN8
AUDIO OUTPUT V8 5AQ5
1ST VIDEO IF V1 3BZ6
2ND VIDEO IF V2 3BZ6
3RD VIDEO IF V3 A 5AM8
VIDEO DET V3 B 5AM8
VIDEO OUTPUT V4 A 6BA8A
AGC KEYING V5 3AU6
SYNC SEP V4 B 6BA8A
SYNC AMP V5 B 5U8
VERT MULT V5 6CM7
HORIZ AFC V10 6CG7
HORIZ OSC
HORIZ OUTPUT V11 12DQ6A
HV RECT V13 1G3GT
DAMPER V12 12D4GT
VOLUME
TONE
CONTRAST
BRIGHTNESS
FOCUS
HEIGHT
VERT HOLD
VERT LINEARITY
HORIZ HOLD
HORIZ WAVE FORM
VERT MULT VERT OUTPUT
PICTURE TUBE V14 21CBP4A
ELECTROSTATIC SPEAKERS
BEAM ALIGN MENT MAGNET
DEFLECTION YOKE
CIRCUIT BREAKER
ON-OFF SWITCH
TO TUNER FILAMENTS
TO CONTROL PLATE
TO TUNER BRACKET
TO PICTURE TUBE HV ANODE
DENOTES CHASSIS GROUND
ADDITIONAL SCHEMATICS PAGE
TUNER 95-168-0 (VHF) 5
TUNER 95-169-0 (VHF with UHF provisions) 7
TUNER 95-164-0 (UHF) 16
RADIO 7777A (CH 528 531901) 14
COMPONENT COMBINATIONS 13
12D4GT 12DQ6A 6CG7 6CM7 21CBP4A 3AU6 5AQ5 6BN8 5U8
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1 DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings.
5 All controls set for normal operation, no signal applied

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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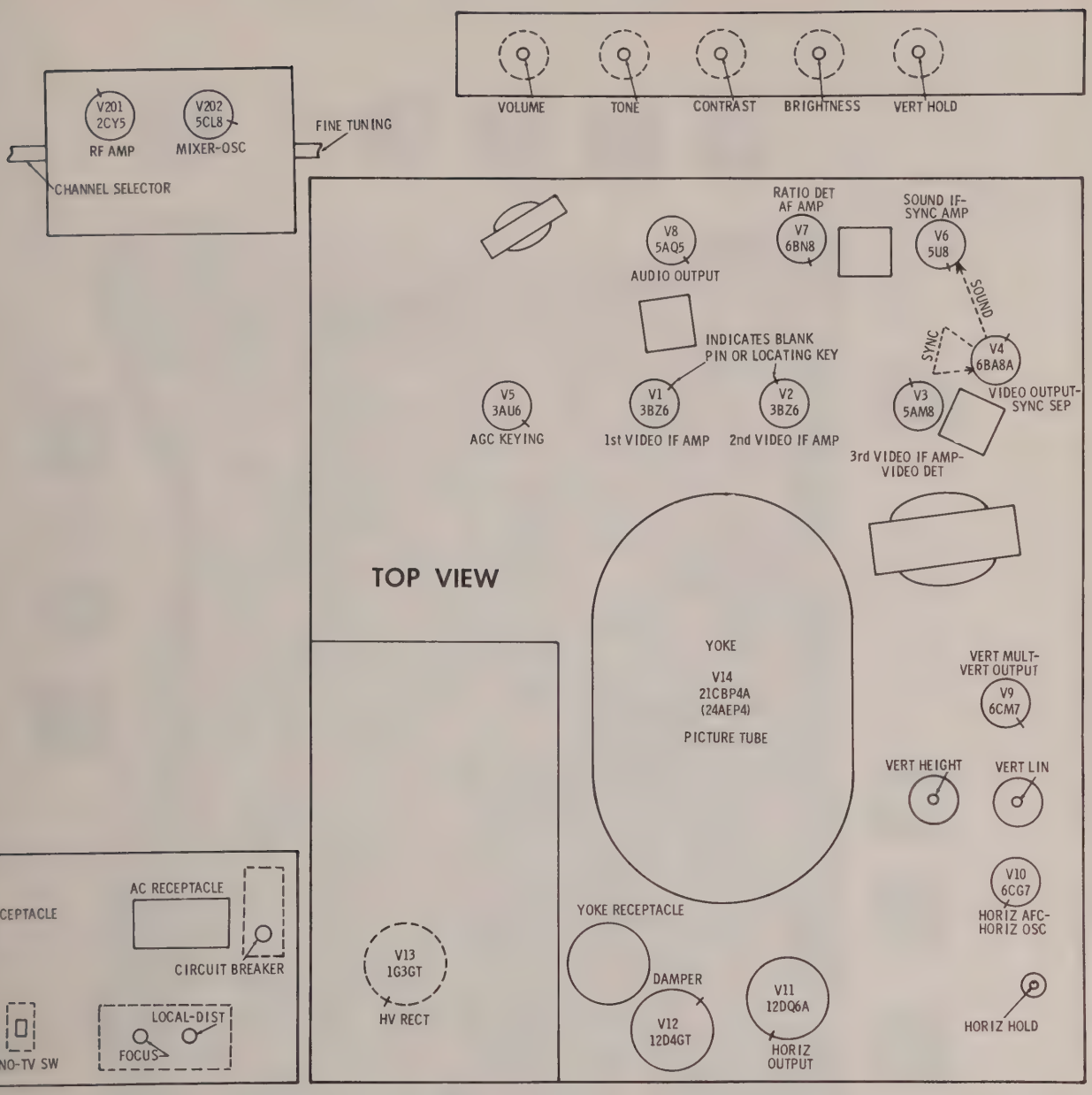
SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A (Ch. 528.51400, 401, 410, 411, 528.531901)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

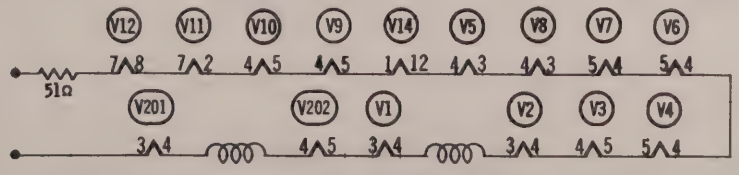
POWER SUPPLY FAILURE
No raster, no sound Circuit Breaker (M10), LV Rect. (M1, M2)

SWEEP FAILURE
No raster, has sound V10, V11, V12, V13, V14
No vertical deflection V9
Poor vert. linearity or foldover V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, M1, M2
Vert. off freq. V9
Horiz. off freq. V10

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V14
Has pic, no sound V6, V7, V8
Overloaded picture V5

SYNC FAILURE
No vert. sync V4, V6
No horiz. sync V4, V6, V10
No vert. or horiz. sync V4, V6

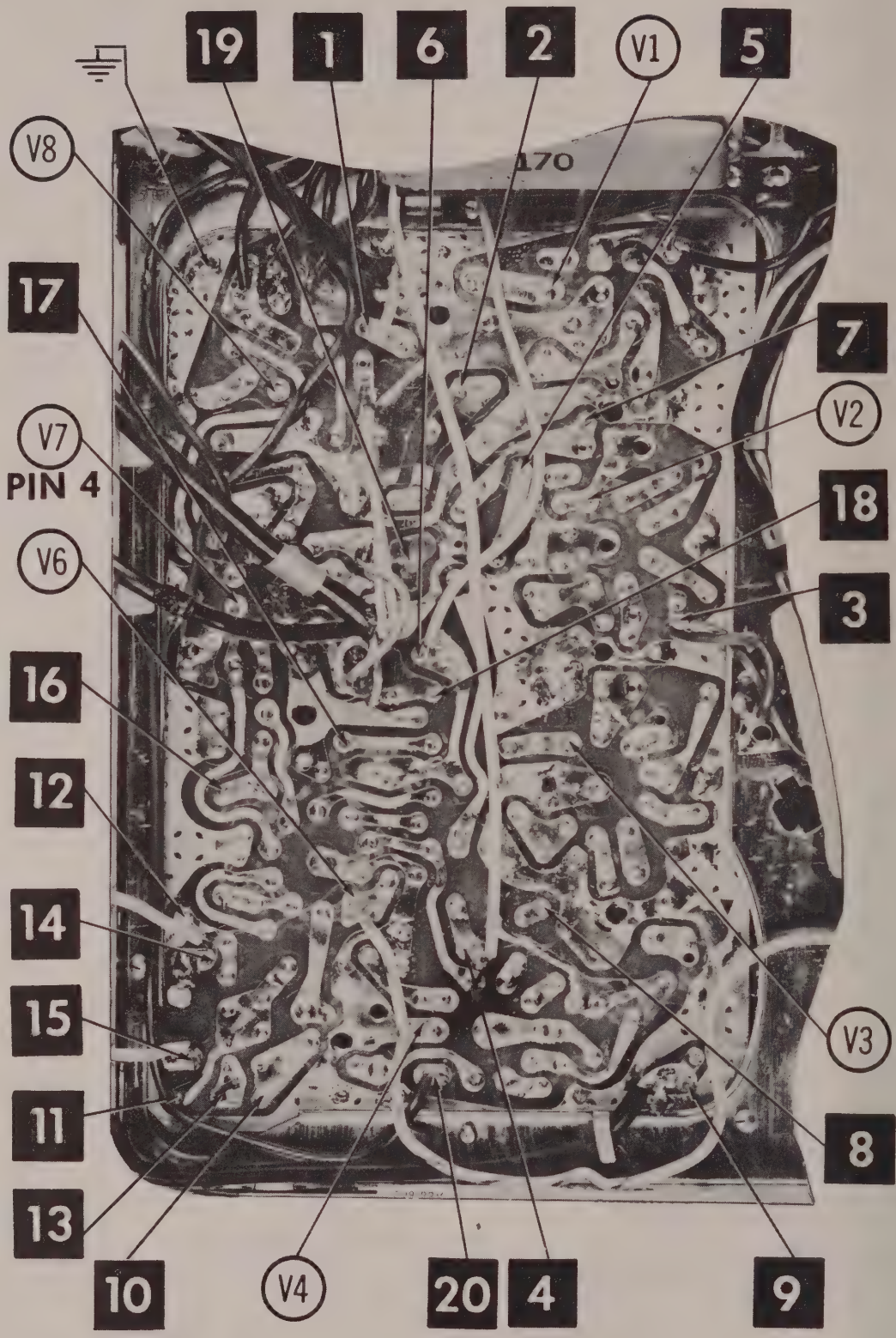
This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A (Ch. 528.51400, 401, 410, 411, 528.531901)

FOLDER 3

CircuiTrace Numbers 1 thru 20



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*TRADE MARK

IF, SYNC & SOUND
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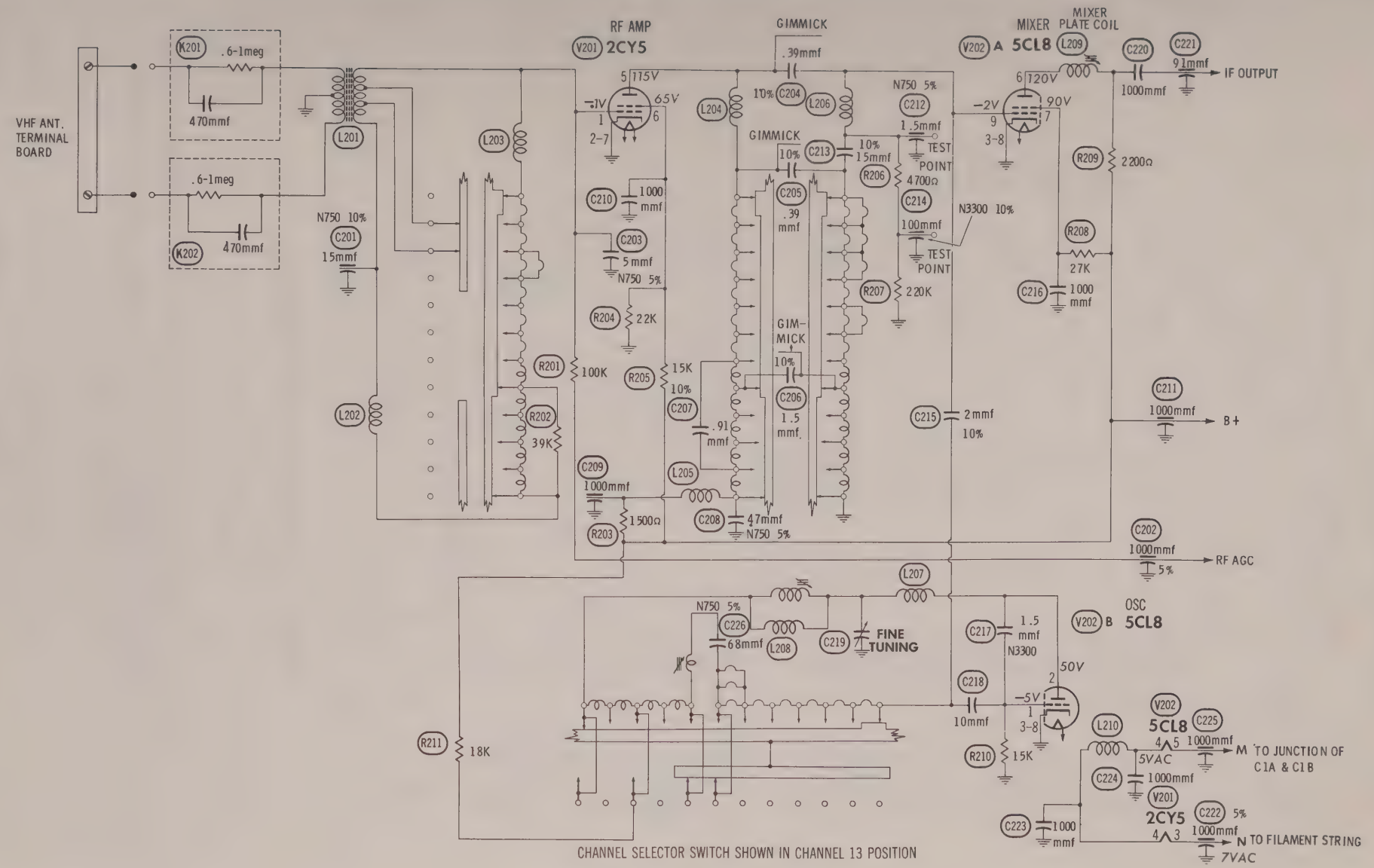
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



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VHF TUNER 95-168-0

SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A(Ch. 528.51400, 401, 410, 411, 528.53190)

TUNER PARTS LIST AND DESCRIPTIONS

95-168-0

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	2CY5	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	5CL8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	15		258-150						N750 10%
C202	1000		244-1						5%
C203	5		225-509						N750 5%
C204	.39		2101-398						10%
C205	.39		2101-398						10%
C206	1.5		2101-159	NPO-SI 1.5	TCZ-1R5	CTA6V15C	ZT-5515	5TCCB-V15	10%
C207	.91		2101-918						10%
C208	47		233-470						N750 5%
C209	1000		271-1	EF-001	MFT-1000			503C-D1	
C210	1000		2033-23	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C211	1000		271-1	EF-001	MFT-1000			503C-D1	
C212	1.5		259-159						N750 5%
C213	15		222-150	NPO-DI 15	DTZ-15	C10Q15C	ZT-5415	5TCC-Q15	10%
C214	100		252-101						N3300 10%
C215	2		2101-209						10%
C216	1000		2033-23	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C217	1.5		166-159						N3300
C218	10		164-100	SI 10	D6-100	LT6Q1	UC-541	5HK-Q1	
C219			1713-512						
C220	2000		2033-23	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C221	91		262-910						
C222	1000		244-1						5%
C223	1000		2033-23	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C224	1000		2033-23	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C225	1000		271-1	EF-001	MFT-1000			503C-D1	
C226	68		233-680						N750 5%

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R201	100K		106-104	
R202	39K		106-393	
R203	1500Ω			
R204	22K		106-223	
R205	15K		106-153	
R206	4700Ω		106-472	

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R207	220K		111-224	
R208	27K		106-273	
R209	2200Ω		106-222	
R210	15K		106-153	
R211	18K		106-183	

COILS (RF-IF)

ITEM No.	USE	SILVERTONE PART No.	NOTES
L201	Ant. Trans.	2309-5	
L202	RF Choke	310-4	
L203	RF Choke	310-4	
L204	RF Choke	313-7	
L205	RF Choke	301-23	

ITEM No.	USE	SILVERTONE PART No.	NOTES
L206	Mixer Grid	312-6	
L207	RF Choke	310-3	
L208	RF Choke	311-10	
L209	IF Trap	2110-9	
L210	Fil. Choke	300-20	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA	
K201	Antenna Isolation	470mmf, .6-1meg	330-1	Centralab Sprague	RC-471 AC1-1
K202	Antenna Isolation	470mmf, .6-1meg	330-1	Centralab Sprague	RC-471 AC1-1

TUNER ALIGNMENT INSTRUCTIONS

Suggested alignment tools .....General Cement #8607
Walsco #2523

VHF OSCILLATOR ALIGNMENT

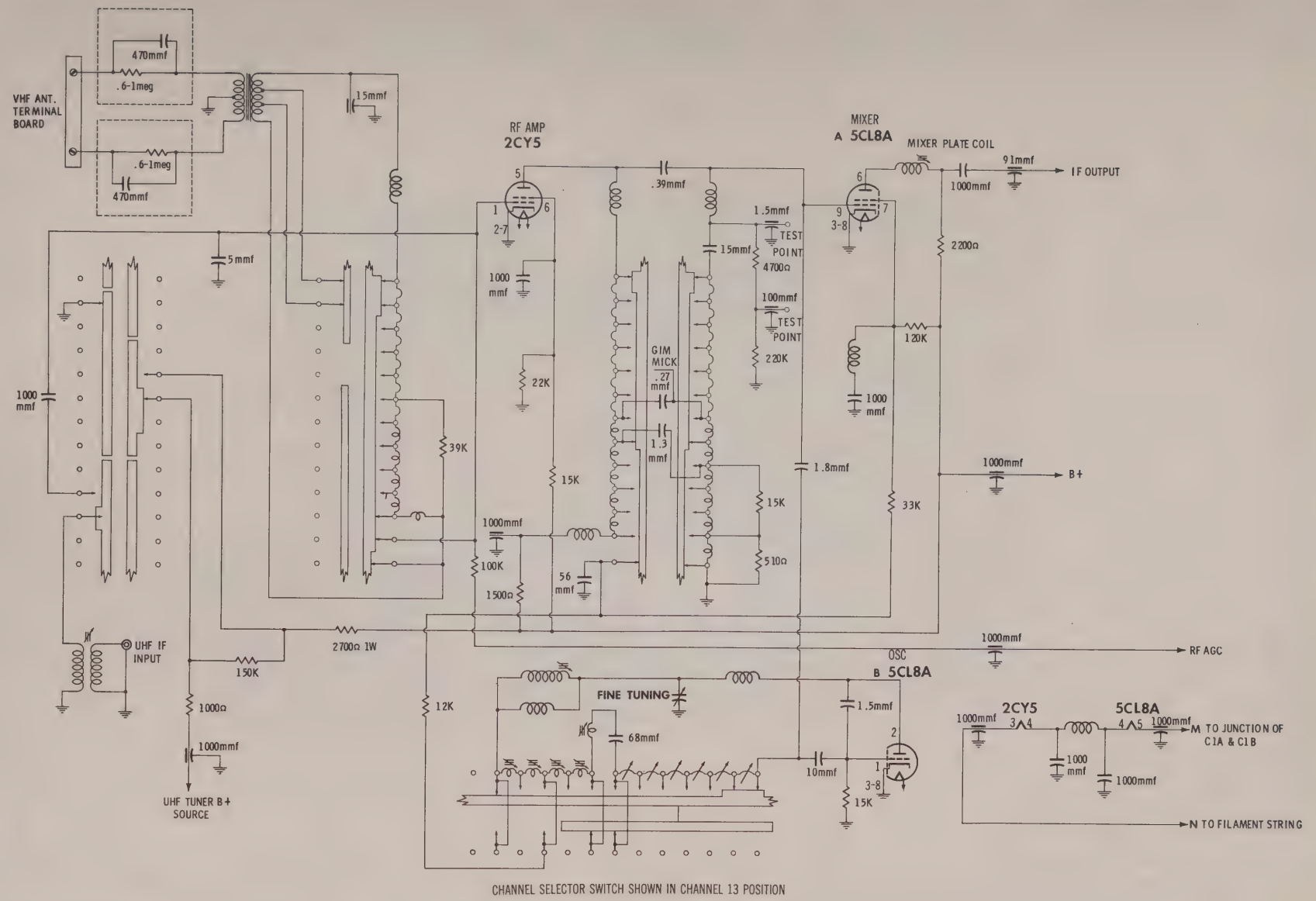
Turn the set on and allow 15 minute warm-up period. Set the Fine Tuning to the center of its range. This is accomplished by turning the Fine Tuning so that the dot on the fine tuning drive wheel is aligned with the dot on the tuner housing.
Turn the Channel Selector to the highest frequency channel operating in the area. With a non-metallic screwdriver, adjust the proper oscillator adjustment screw for clearest picture. The oscillator adjustment screws are identified by the channel number stamped into the metal next to the proper adjustment opening. Channels 7 and 8 share the same screw for adjustment, all others have separate adjustment screws.
Be very careful not to turn any of the adjustment screw too far counterclockwise, or they will fall out.
Always adjust the highest operating channel first, then the others in descending order.

VHF RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.



CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION

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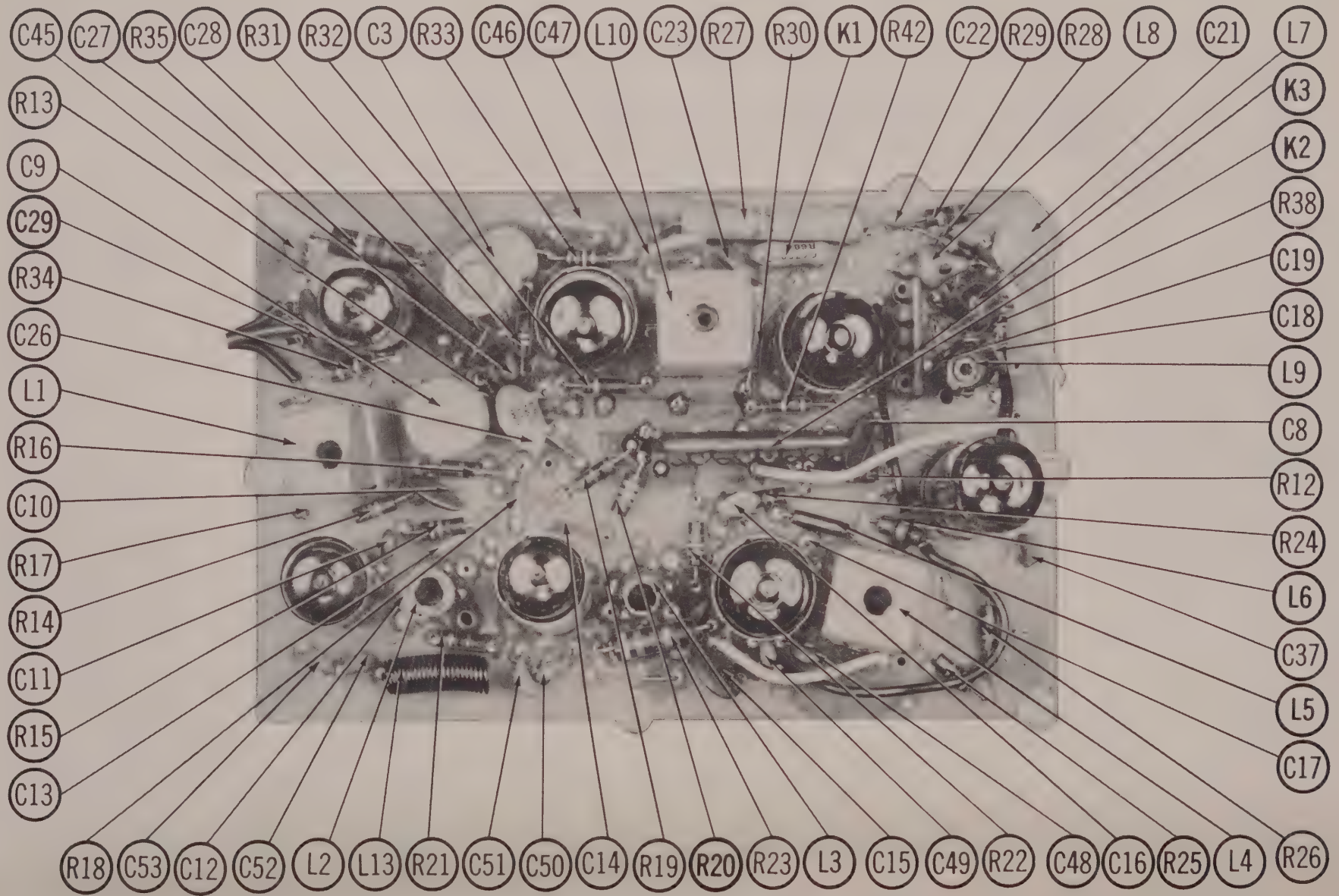
VHF TUNER WITH UHF PROVISIONS 95-169-0

SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A(Ch. 528.51400, 401, 410, 411, 528.53190-1)



IF, SYNC & SOUND - PRINTED BOARD

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: General Cement #8282, 8606, 8606L or 9295
Walsco #2543, 2544 or 2545

VIDEO IF ALIGNMENT

Short antenna terminals together, but not to ground.
Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
Detune A2, A4, A5 and A6 by presetting for maximum core separation.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202) and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.15MC	Any non-interfering channel	DC probe thru 10K to point (B). Common to chassis. (Across Video Det. load)	A1	Adjust for maximum deflection. Detune Mixer Plate Coil by turning slug fully counterclockwise.
2.	"	"	"	"	"	A2	Adjust for maximum deflection.
3.	"	"	"	"	"	Mixer Plate Coil	"
4.	"	"	42.75MC	"	"	A3	"
5.	"	"	45.5MC	"	"	A4	"
6.	"	"	47.25MC	"	"	A5	Adjust for MINIMUM deflection. Repeat steps 5 and 6.
7.	"	"	41.25MC	"	"	A6	Adjust for MINIMUM deflection.

OVERALL VIDEO IF RESPONSE CHECK

Short antenna terminals together, but not to ground.
Attenuate sweep generator to maintain not more than 2 volts peak to peak on scope (-3 volts DC at point (B)).
If separate marker generator is used, couple loosely to the sweep cable.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.15MC (10MC Swp)	41.25MC 42.55MC 43.8MC 44.15MC 45.0MC 45.75MC 47.25MC	Any non-interfering channel	Vert. Amp. thru 10K to point (B). Low side to chassis. (Across Video Det. load)		Check for response similar to Fig. 1. Retouch Mixer Plate Coil, if necessary to place 45.75MC marker at 50%. A2 may be retouched for correct tilt.

SOUND IF ALIGNMENT

Connect two matched 100K (±1%) resistors in series from point (C) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.001mfd	High side to point (B). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point (C). Common to chassis.	A7, A8, A9	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (E). Common to point (D).	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

4.5MC TRAP ALIGNMENT

Tune in a strong TV signal and check the picture for evidence of 4.5MC beat interference. If necessary, retouch A7 until the horizontal scanning lines are smooth and continuous.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 6

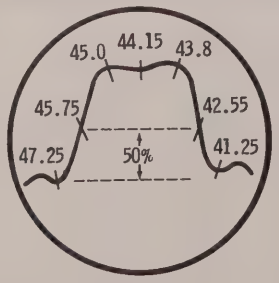


FIG. 1

SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A(Ch. 528.51400, 401, 410, 411, 528.53190)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	1st Video IF Amp	3BZ6	
V2	2nd Vide- IF Amp	3BZ6	
V3	3rd Video IF Amp. - Video Det	5AM8	
V4	Vide- Output-Sync Sep	6BA8A	
V5	AGC Keying	3AU6	
V6	Sound IF Amp.-Sync Amp.	5U8	
V7	Ratio Det -AF Amp	6BN8	
V8	Audio Output	5AQ8	
V9	Vert. Mult.-Vert. Output	6CM7	
V10	Horiz. AFC-Horiz. Osc.	6CG7	
V11	Horiz. Output	12DQ6A	
V12	Damper	12DG7	
V13	HV Rect.	1G3GT	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	SILVERTONE PART No	GENERAL ELECTRIC PART No	RCA PART No	SYLVANIA PART No	
V14	21CBP4A		21CBP4-A ①	21CBP4, ① 21CBP4A ②	① "Silverama" ② ② "Silver Screen 85"
	24AEP4		24AEP4 ①	24AEP4 ②	

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP	VOLT	SILVERTONE PART No	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No	PYRAMID PART No	SANGAMO PART No.	SPRAGUE PART No.
C1A	120	150	18-50-5	PR2-050	BR15015 BR15015	TCS43		MT-15150 MT-15150	R2526 *
B	120	150							
C2A	40	300	18-23-2	PR5-500		WV404		Q-056 MT-1550	R2325 *
B	20	300							
C	20	300							
D	20	300							
E	50	75							
C3	4	50	18-25-0	PRS150V4	BSR4-50	TT50X4	TD-4-50	MT-0504	TVA-1402
C4	25	15	18-66-5	PRS25V25	BSR25-25	TT15X30	TD-25-25	MT-0225	TVA-1205
C5	20	350	NP-PRS 350V20	BR4035 † BR4035	TC78 † TC78	TD-40-350 † TD-40-350	MT-4540 † MT-4540		R2746 *

† Connect negative leads together.
* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	.047	200	18-47326	P288N-047	DF-503	CUBS2S47	GEM-6147	2TM-S47	
C7	22	200	18-22426	P288N-22		CUBS2P22	GEM-3022	2TM-P22	
C8	5000		15-50217	BPD-005	DD-503	BYA10D5	DC535	5HK-D5	
C9	47	100	20-117-1	P288N-47		BC2P47J		2SK-P47	
C10	5000		20-67-0	BPD-005	DD-502	BYA10D5	DC535	5HK-D5	
C11	470		20-68-0		D6-471	SR5T47		MS-347	10%
C12	27					C10Q27C			NPO 10%
C13	1000		15-10217	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C14	680		20-116-0		D6-681	1R5T68		MS-368	10%
C15	5000		20-67-0	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C16	1000		20-66-0			1R5I1	MCS255	MS-31	10%
C17	4.7		20-23-0	NPO-S1 4.7	TCZ-4R7	CTA5V47C	ZT-5547	5TCCB-V47	10%
C18	33								N150
C19	33								N150
C20	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C21	.047	400	20-44-1	P488N-047		BC5S47J	ACE5147	4SK-S47	
C22	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C23	2000		20-69-0	BPD-002	DD-203	BYA10D2	DC522	5HK-D2	①
C24	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C25	.047	600	20-647-1	P688N-047	DF-503	CUB5S47	GEM-6147	6TM-S47	
C26	10000		20-86-0	BPD-01	DD-103	BYA5S1	DC511	5HK-S1	
C27	1000		20-78-0			1R5I1	MCB255	MS-35	10%
C28	5000		20-67-0	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C29	5000	2000	20-79-0		DD50-502	HVC20D5			
C30	.022	400	15-22343	P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	①
C31	.047	600	20-90-1	P688N-047	DF-503	CUB5S47	GEM-6147	6TM-S47	
C32	.047	600	20-647-1	P688N-047	DF-503	CUB5S47	GEM-6147	6TM-S47	
C33	0068	600	20-97-1				GEM-16268		10%
C34	01	1000	20-76-1				GEM-1611		10%
C35	1	400	20-42-1	P488N-1		BC6P1J	ACE401	4SK-P10	
C36	.056	400	20-116-1				GEM-6156		
C37	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C38	.22	200	20-43-1	P288N-22		BC2P22J	ACE5022	2SK-P22	
C39	375	600	20-107-0						N750 10%
C40	01	600	20-18-1	P688N-01	D6-103	CUB6S1	GEM-6S1	6TM-S1	
C41	1000		20-9-2	1464-001		1R5I1	MCE255	MS-31	5%
C42	.047	400	20-90-1	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C43	68	6000	15-68414						N750 10%
C44	10000		20-65-0	BPD-01	DD-103	BYA5S1	DC511	5HK-S1	
C45	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C46	10000		20-86-0	BPD-01	DD-103	BYA5S1	DC511	5HK-S1	
C47	10000		20-86-0	BPD-01	DD-103	BYA5S1	DC511	5HK-S1	②
C48	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	③
C49	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C50	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C51	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C52	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C53	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C54	.047	600	20-647-1	P688N-047	DF-503	CUB5S47	GEM-6147	6TM-S47	
C55	.047	600	20-647-1	P688N-047	DF-503	CUB5S47	GEM-6147	6TM-S47	
C56	1000		20-65-0	BPD-001	DD-102	BYA5D1	DC521	5HK-D1	
C57	10000	900	20-122-0	DAC-27	DD-103	BYA10SM	UAC-110	BL-S10	③

① Ch. 528.51401, 411 use .01mfd ② 400V in this application (Part #15-10343).
③ Some versions may use 5000mmf in this application (Part #20-66-0).
Not used in some versions.

CONTROLS

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	CENTRALAB PART No	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	24-322-0	AB-70	A47-1meg-Z	QJ1-137	TA18A	Volume, Note 1
B	Shaft			AK-8	RS-3/16	NQ	DS-37	
R2A	250K	½	24-177-3	AB-41	A47-250K-Z	QJ1-130	U44	Tone
B	Shaft			AK-5	RS-3/16	NQ	DS-37	
R3A	200Ω	½	24-134-1	AB-3		QJ1-301		Contrast
B	Shaft			AK-5		NQ		
R4A	3meg	½	24-121-1	AB-94	A47-3meg-S	QJ1-140	TA36L	Brightness
B	Shaft			AK-9	RS-3/16	NQ	DS-37	
R5A	1meg	½	24-134-1	AB-89	A47-1meg-S	QJ1-137	TA16L	Vert. Hold
B	Shaft			AK-8	RS-3/16	NQ	DS-37	
R6	5000Ω	½	24-267-1					Vert. Lin., Note 2
R7	7meg	½	24-266-1					Height, With 330K Stop
R8A	3meg	½	24-133-1	AB-84	B47-3meg-S	QJ1-140	PTA356L	Focus, Note 3
B	Shaft			AK-19	Not Req.	TQ	Not Req.	
C	3meg	½		AB-84	B47-3meg-S	QJ1-140	PTA356L	AGC, Note 3
D	Shaft			AK-19	Not Req.	TQ	Not Req.	

Note 1. Some versions may use 500K in this application.
Note 2. Alternate Part #24-114-1.
Note 3. Individual control Part #24-132-1.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R9	680K		60-68401	
R10	8.8meg		60-88501	
R11	10K			
R12	220K		60-22401	
R13	56K		60-56301	
R14	5600Ω		60-56301	
R15	330Ω		60-33102	
R16	1000Ω		60-10202	
R17	56Ω		60-56001	
R18	18K		60-15301	
R19	1000Ω		60-10202	
R20	330Ω		60-33102	
R21	56Ω		60-56001	
R22	56K		60-56301	
R23	47000Ω	1	60-47321	
R24	220Ω		60-22101	
R25	4700Ω		60-47301	
R26	18Ω		60-18001	
R27	4700Ω	4	61-5-1	
R28	100K		60-10402	
R29	100K		60-10402	
R30	2200Ω		60-22202	
R31	18K		60-18301	
R32	8.8meg		60-88502	
R33	220K		60-22401	
R34	4700K		60-47402	
R35	370Ω	1	60-37111	
R36	220K		60-22402	

ITEM No.	RATING		SILVERTONE PART No	NOTES
	OHMS	WATT		
R37	47K		60-47302	
R38	47K		60-47301	
R39	560Ω		60-56401	
R40	150K		60-15401	
R41	47K		60-47301	
R42	8200Ω		60-82301	
R43	680K		60-68401	
R44	100K	1	60-10411	
R45	2.2meg		60-22502	
R46	1000Ω		60-10202	
R47	560Ω			
R48	560Ω			
R49	150K	1	60-15411	
R50	180K		60-18401	
R51	82000Ω		60-82201	
R52	4700Ω	2	60-47221	
R53	56Ω		60-56001	
R54	1000Ω	1	60-10211	
R55	3.8Ω		60-39901	
R56	4700Ω		60-47202	
R57	6.8Ω	10	61-115-0	
R58	170Ω 5%	15	61-128-0	
R59	51Ω	25	61-118-0	
R60	120Ω	2	60-12231	
R61	1800Ω	15	61-31-0	
R62	47Ω	1	60-47112	
R63	1600Ω 5%	10	61-135-0	
R64	4.7meg		60-47503	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		SILVERTONE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1A	1st. Video IF	10-82-2					
B	41.25MC Trap						
L2A	2nd. Video IF	10-16-3					
B	47.25MC Trap						
L3	3rd. Video IF	10-17-3					
L4	4th. Video IF	10-63-2					
L5	Resonant Choke	10-65-1					12 Microhenries
L6	Series Peaking Coil	10-64-1		TV-198	6110		60 Microhenries
L7	Series Peaking Coil	10-66-1	19-3250 *	TV-198 *	6130 *	VP-6 *	270 Microhenries, wound on 15K resistor
L8	Shunt Peaking Coil	10-88-1	19-3250	TV-198	6130	VP-6	270 Microhenries
L9	1st. Sound IF	10-146-1					
L10	Ratio Detector	10-21-0					
L11	RF Choke	10-138-1	19-1002	SW-830	4606		2.6 Microhenries
L12	RF Choke	10-138-1	19-3250	TV-198	6130	VP-6	270 Microhenries
L13	Fil. Choke	10-138-1	19-1002	BC-563	4606		23 Microhenries
L14	Line Choke	10-149-1	19-3036	TV-180	6176	VP-1	40 Microhenries
L15	Line Choke	10-149-1	19-3036	TV-180	6176	VP-1	40 Microhenries

* Parallel with 15K resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI	SEC.	SILVERTONE PART No.	Meissner PART No	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No	
L16A	77Ω		10-13-5						Horiz. Freq. Tapped ② 22Ω
B	44Ω								Horiz. Waveform

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA								
		SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	Vert. Output	B80-1-2C	Z1807 ①	A-2824 ①	V315 ①		VO-101 ②	26876	A-119X ②	
	Alt. Vert. Output	80-1-2								
T2	Yoke-Horiz. (20MH) (90°) Vert. (41MH)	D80-5-4C ③	DF-607 ③ ⑤	MDF-92 ③ ⑤	Y90F19/43 ③ ⑤	PCM2045 ③ ⑤	DY-16A ③ ⑤	Y-16 ③ ⑤	Y-41 ⑤ NW23 ⑤	
	Alt. Yoke	80-5-4								
	Rear Cover & Centering Device	83-936							YC-1 & CL-1	
	Alt. Rear Cover & Centering Device	83-1024								
	Yoke Clamp	22-2-3								
T3	Horiz. Output	80-6-3B								
	Alt. Horiz. Output	80-6-3								

① Cut and tape blanking lead.
② Drill new mounting hole(s).
③ Includes yoke plug.
④ Use original rear cover and centering device. Use original yoke damping network, if necessary.
⑤ Jumper yoke terminal #5 and #6, connect to pin #5 of yoke plug, yoke terminal #3 to yoke plug pin #7, yoke terminal #7 to yoke plug pin #2, yoke terminal #4 to yoke plug pin #3. Use original width sleeve.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T4	4800Ω	3-4Ω	80-72-1	Z1107 ①	A-3026	AU-601 ①	A-3877 ①	24848	S-5X	① Drill new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	6" x 9"	PM	3-4Ω	53-369-4	69A3	① Part of Speaker Assembly 84-6276
SP2	3" x 4"	Electrostatic		①		
SP3	3" x 4"	Electrostatic		①		
SP4	3" x 4"	Electrostatic		①		
SP5	3" x 4"	Electrostatic		①		

COMPONENT COMBINATIONS

ITEM No	USE	DESCRIPTION	SILVERTONE PART No	REPLACEMENT DATA
K1	Sound IF Decoupling	4700mmf, 68K	13-21-3 ①	Sprague AC15-7
K2	Audio & Sync Network	500mmf 10%, 3000mmf, 5000mmf, 22K, 220Ω, 3300Ω, 470K, 270Ω	13-15-5	
K3	Sync Network	5000mmf, 150mmf 10% N150Q	13-9-5	
K4	Vertical Network	2200mmf, 9000mmf, 9000mmf, 9000mmf, 56K, 12K, 33K, 56K, 22K, 22K	13-20-3 ②	Sprague VS-19
K5	Horiz. Network	5000mmf, 27mmf 10%, 8000mmf, 8000mmf, 120mmf 10%, 47mmf 10%, 680K, 18K, 15K, 330K, 100K, 470K, 330K, 8200Ω	13-18-5 ③	
K6	Tuner Isolation	1000mmf ④ 1000VAC, 4.7meg	13-17-3	Sprague AC15-6

① Some versions may use individual components, 68K (Part #60-6830) and 5000mmf (Part #20-67-0) in this application.
② Alternate Part #13-23-3.
③ Alternate Part #13-22-3 or 13-25-5.

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	SILVERTONE PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No	SARKES TARZIAN PART No.	
M1	.260A	83-829 ①	1236AB ①	1N1008 ③	T300 ① TV500 ②	300 ① 40K ②	① Selenium Type. ② Silicon Type. ③ Germanium Type.
M2	.260A	83-829 ①	1236AB ①	1N1008 ③	T300 ① TV500 ②	300 ① 40K ②	

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M3	Lamp	89-22	#1829
M4	Tuner	95-168-0	VHF Ch. 528.51400, 401
	Tuner	95-169-0	VHF With UHF Provisions, Ch. 528.51410, 411
	Tuner	95-164-0	UHF Ch. 528.51410, 411
M5	Switch	69-209-0	TV-Phono, 3PDT, Slide Type
M6	Switch	69-260-0	On-Off, SPST, Push Type
M7	Switch	69-250-0	Power Tuning, Push Type
M8	Width Sleeve	83-1052	
M9	Magnet	27-66-3	Beam Alignment
M10	Circuit Breaker	43-4-2	
	Alt. Circuit Breaker	43-2-2	
M11	Motor	59-136	
	Printed Board	84-6834	IF, Sync, Sound, Less Tubes
	Printed Board	84-6794	Vert. Horiz., Less Tubes

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

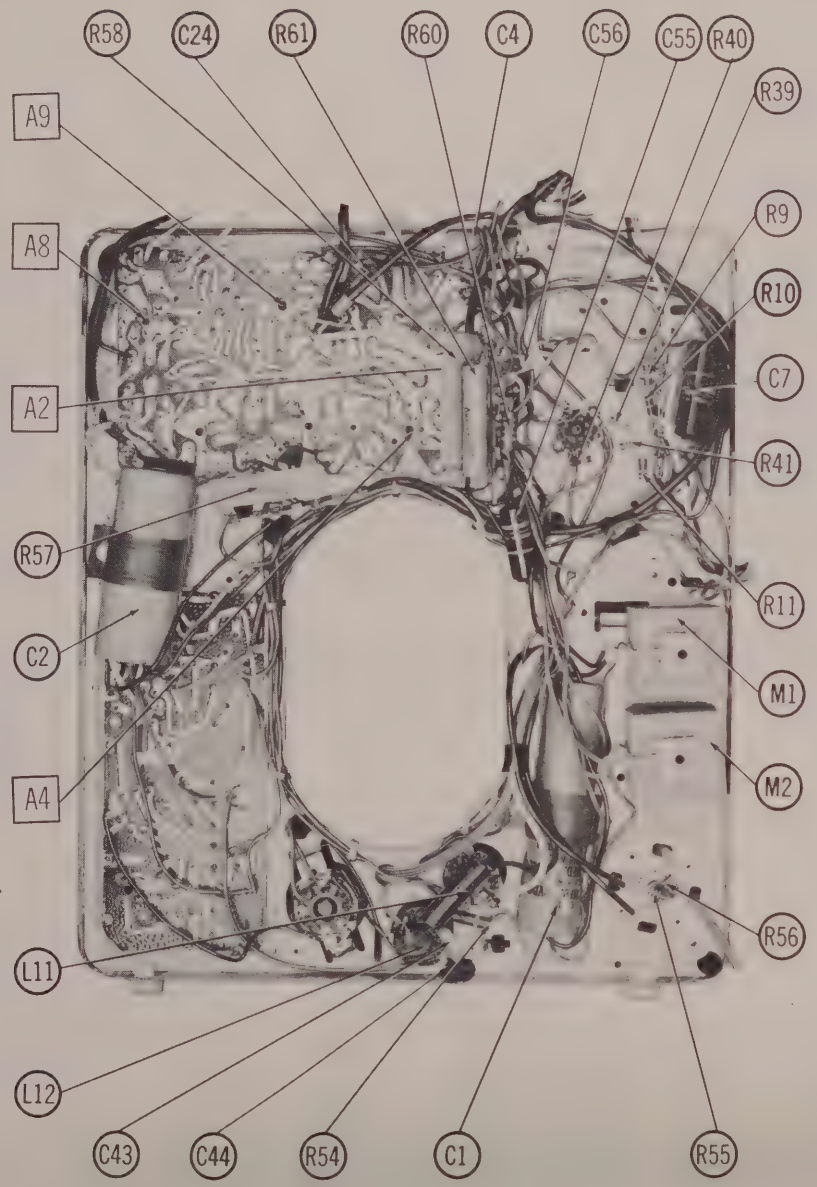
NAME	PART NO.	DESCRIPTION
Safety Glass	48-143-0	Models 9160, 9161, 9162, 9163
Safety Glass	48-142-0	Models 9184, 9185, 9186, 9187, 9188, 9189
Mask	40-30-4	Models 9160, 9161, 9162, 9163
Mask	40-31-4	Models 9184, 9185, 9186, 9187, 9188, 9189
Knob	84-6783	Remote Assembly, Models 9160, 9161, 9162, 9163
Knob	84-6783	Remote Assembly, Models 9184, 9185, 9186, 9187, 9188, 9189
Knob	52-1097-0	Control, 6 Used
Knob	52-926-0	UHF Fine Tuning
Knob	52-924-0	UHF Dial
Dial	97-653-0	Channel Indicator
Touch Bar	52-1108-0	On-Off
Window	48-159-1	Channel Indicator
Cabinet	42-81-0	Models 9160, 9161
Cabinet	42-82-0	Models 9162, 9163
Cabinet	42-87-0	Models 9184, 9185
Cabinet	42-88-0	Models 9186, 9187
Cabinet	42-89-0	Model 9188
Cabinet	42-107-0	Model 9189
Legs	49-359	Models 9160, 9161
Legs	49-360	Models 9162, 9163
Legs	49-366	Models 9184, 9185
Legs	49-367	Models 9186, 9187
Legs	49-368	Model 9188
Legs	49-409	Model 9189

WIRING DATA

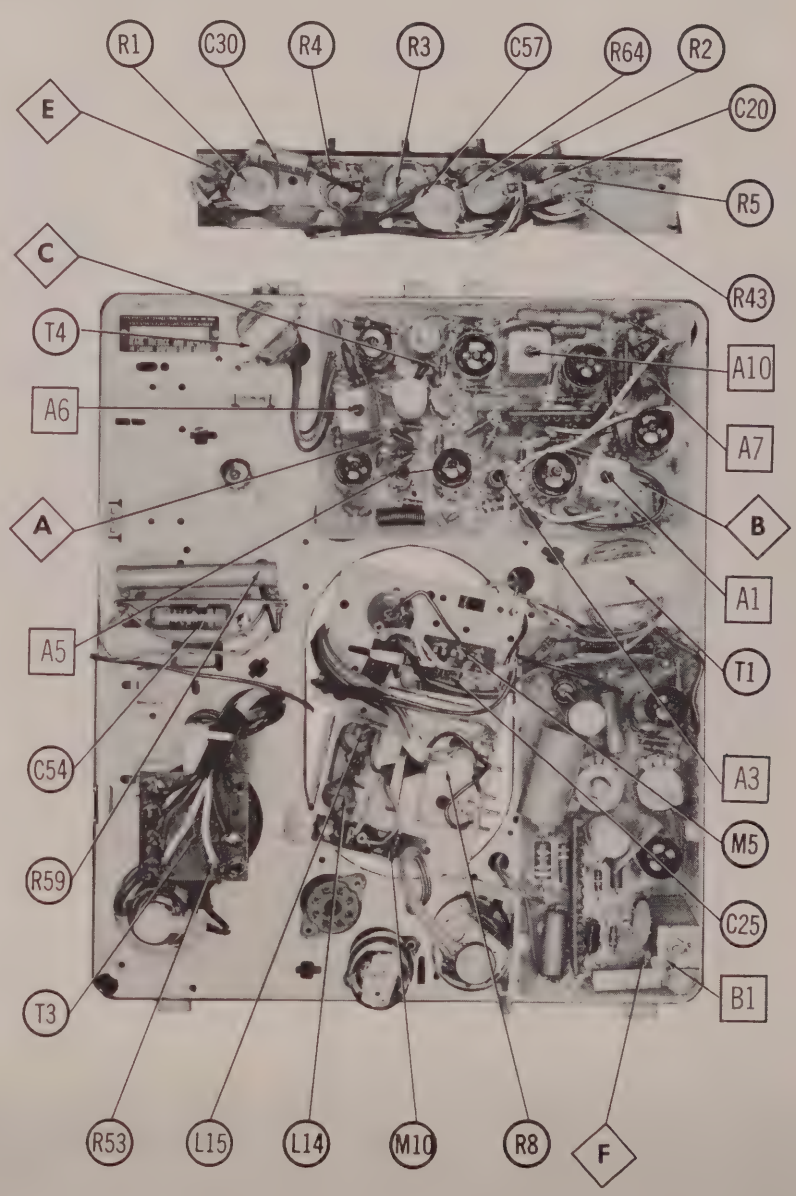
High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8878
300Ω Tuner Input Lead	Use BELDEN No. [illegible]
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8465 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A (Ch. 528.51400, 401, 410, 411, 528.51901)

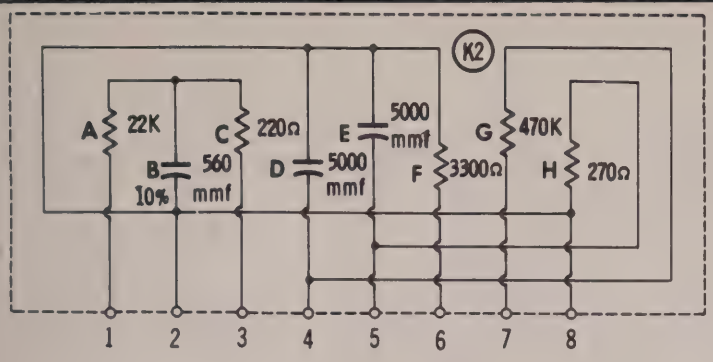
FOLDER 3

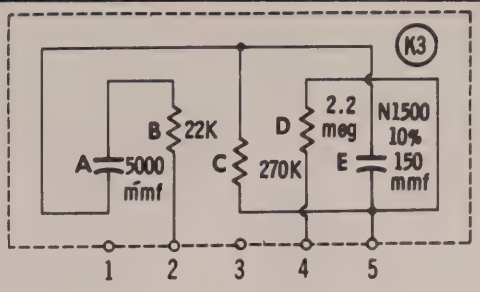


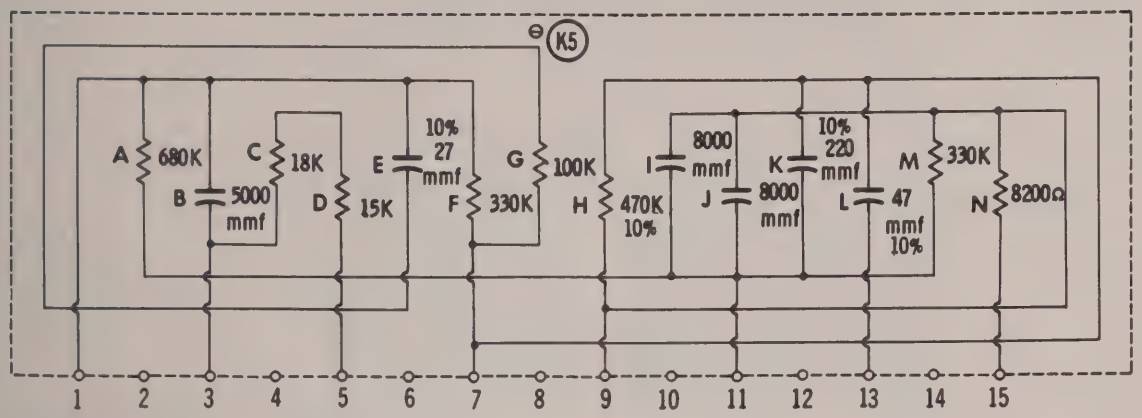
CHASSIS BOTTOM VIEW



CHASSIS TOP VIEW







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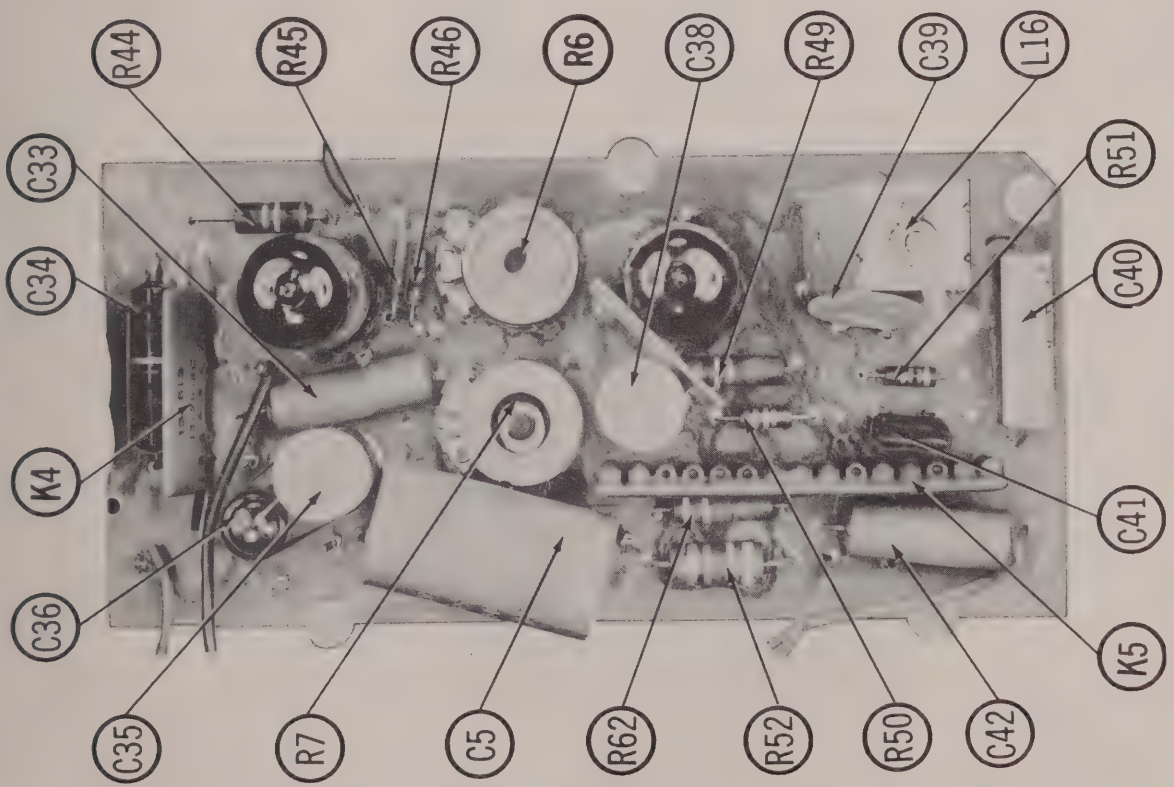
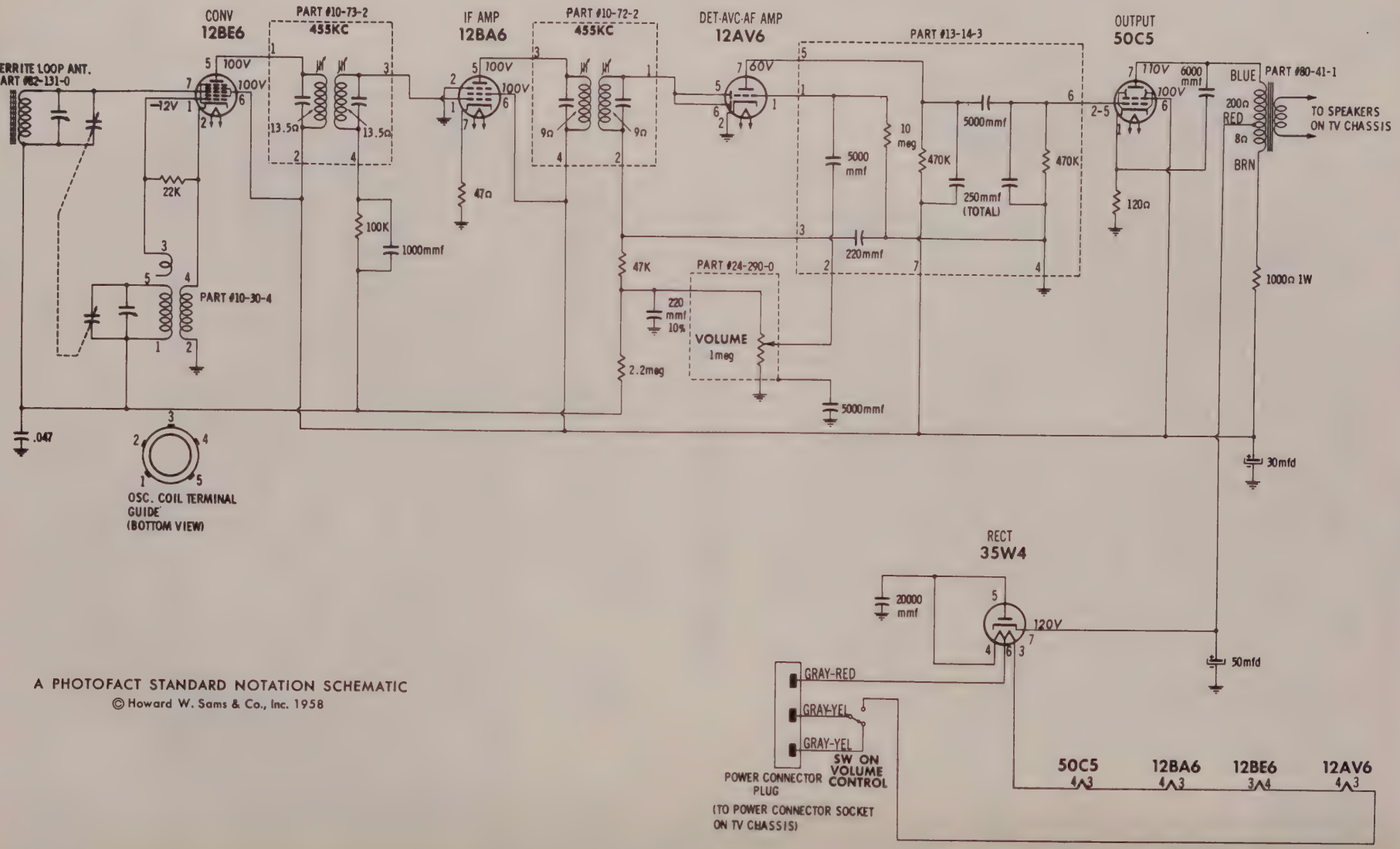
COMPONENT COMBINATION LAYOUT



VERT & HORIZ - PRINTED BOARD

SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A(Ch. 528.51400, 401, 410, 411, 528.531901)



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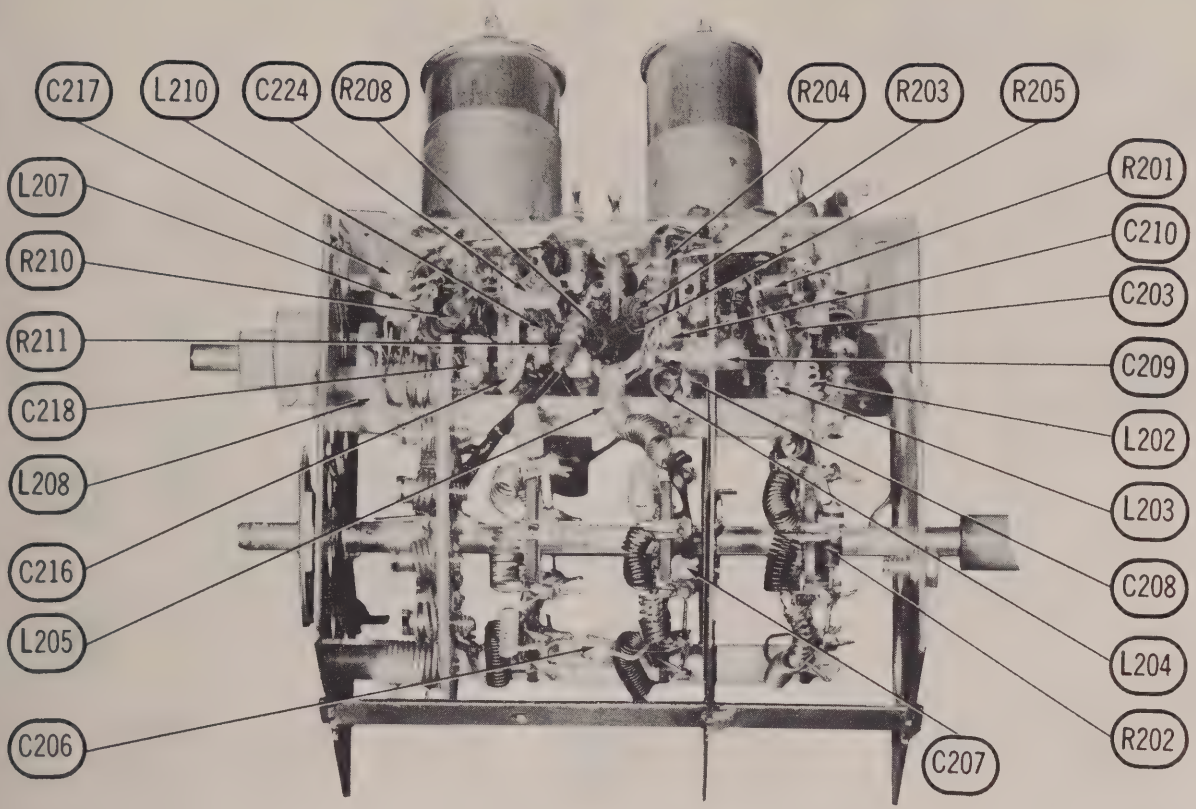
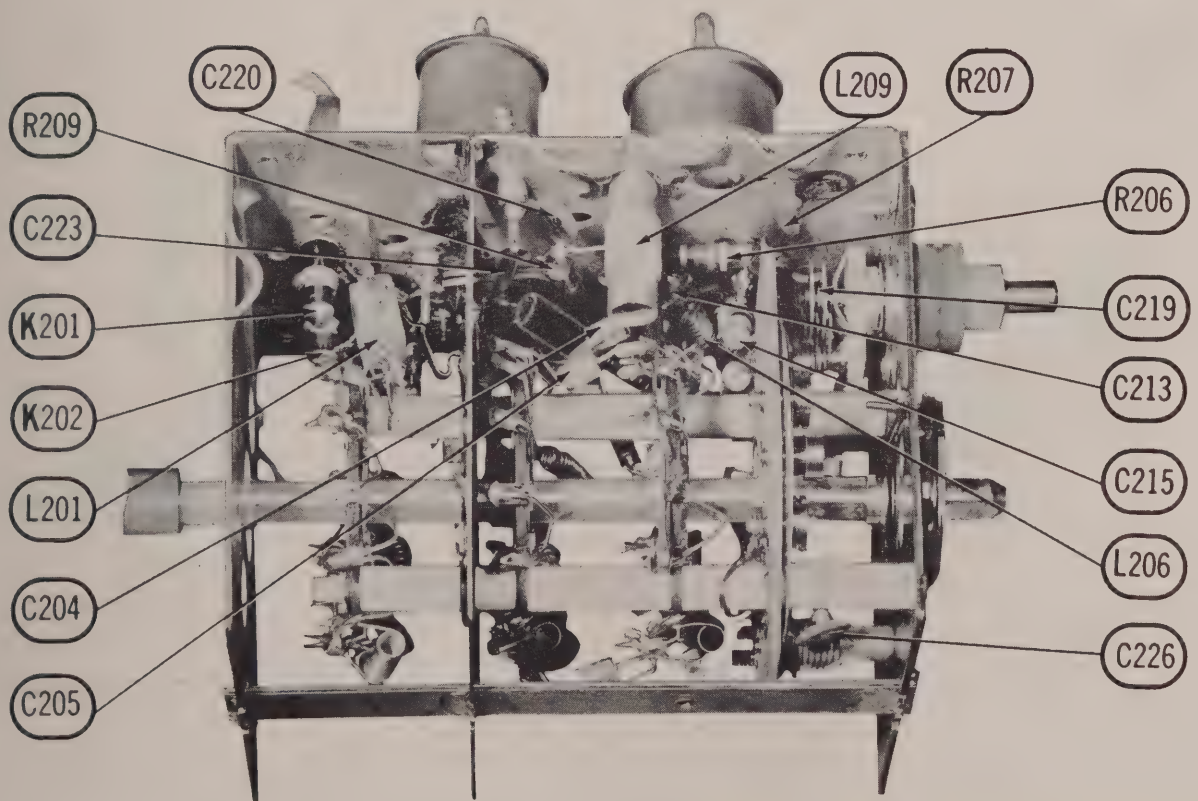
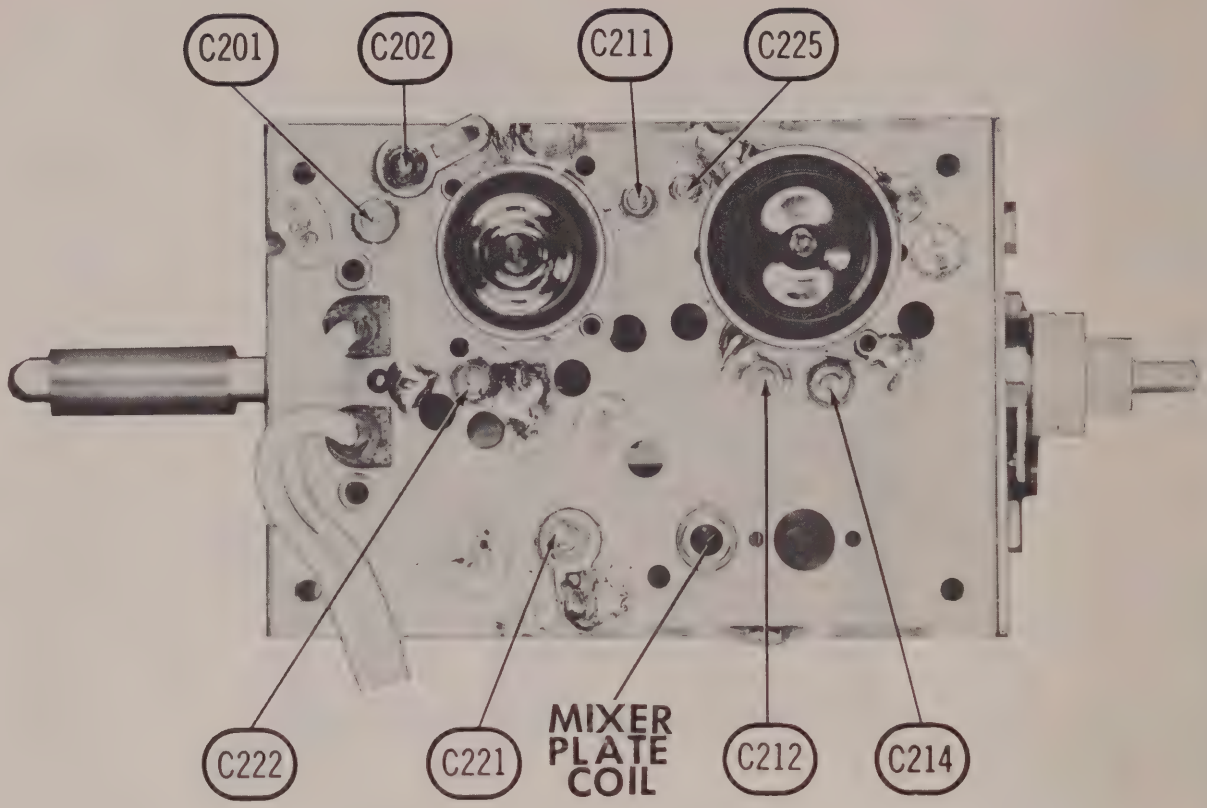
RADIO MODEL 7777A (Ch. 528.531901)



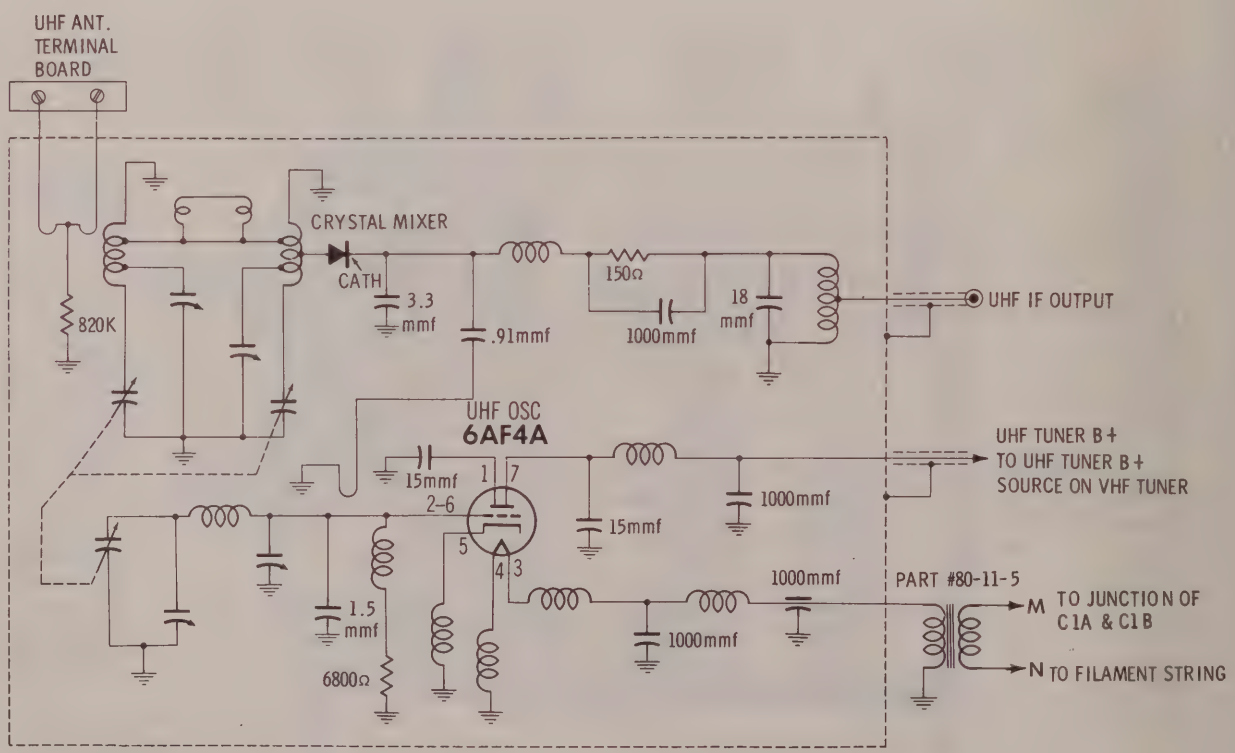
TUNER 95-168-0 - LEFT SIDE



TUNER 95-168-0 - RIGHT SIDE



TUNER 95-168-0 - TOP VIEW



UHF TUNER 95-164-0

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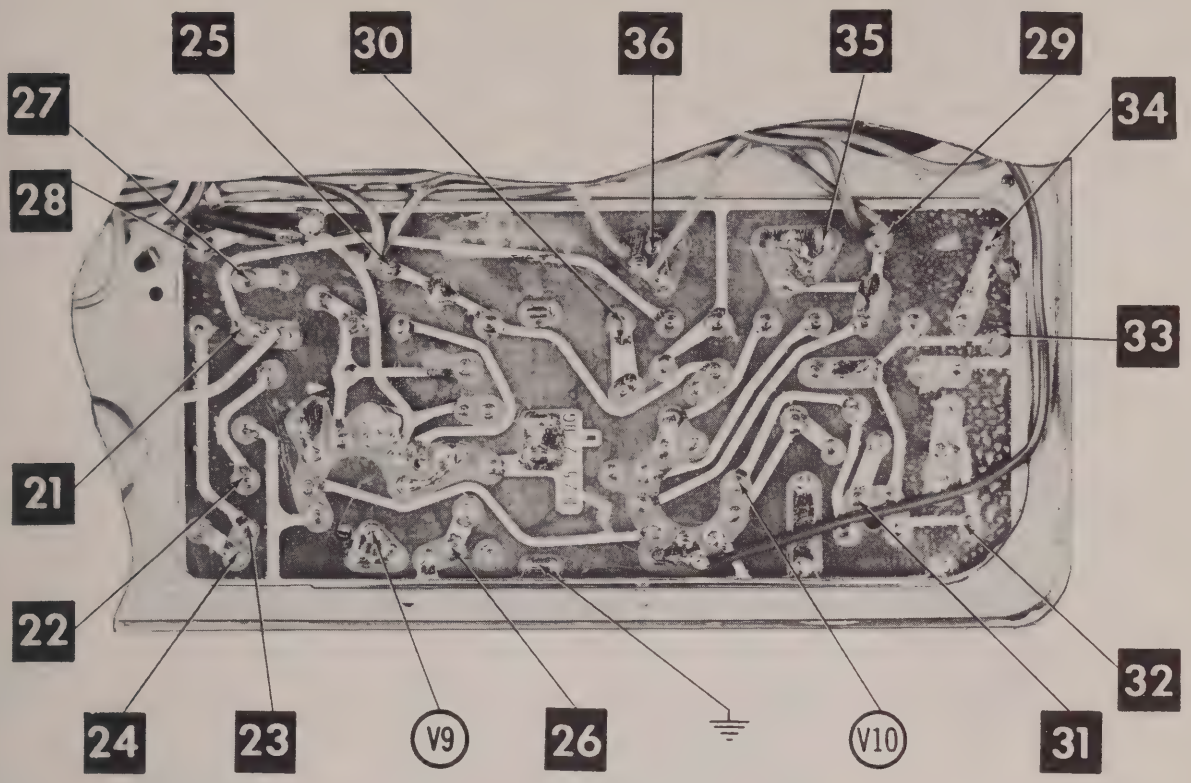
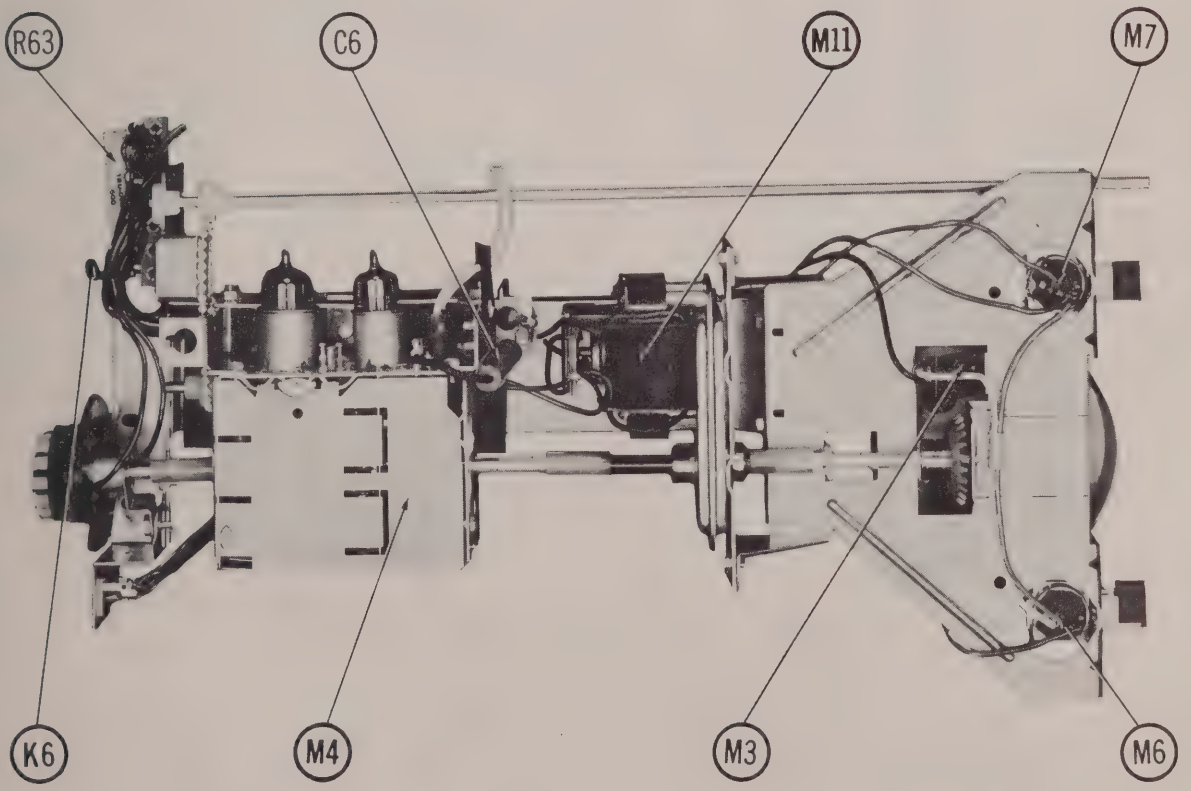
CircuiTrace Numbers 21 thru 36



A Howard W. Sams CIRCUITRACE* Photo
*TRADE MARK

VERT & HORIZ
PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



TUNER & POWER TUNING ASSEMBLY

SILVERTONE MODELS 9160, 9161, 9162, 9163, 9184, 9185, 9186, 9187, 9188, 9189, 7777A(Ch. 528.51400, 401, 410, 411, 528.531901)

FOLDER 3

RESISTANCE MEASUREMENTS

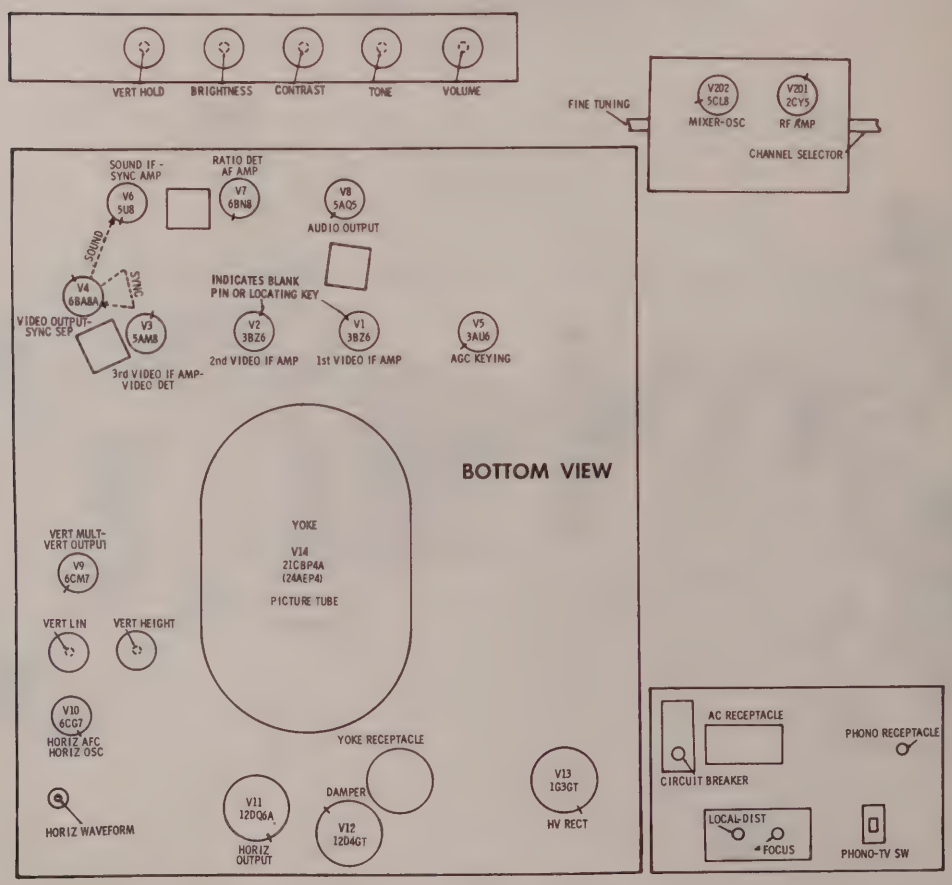
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	61K	56Ω	2Ω	2.5Ω	†2900Ω	†2900Ω	0Ω		
V2	3BZ6	57K	56Ω	2.5Ω	3Ω	†1900Ω	†1900Ω	0Ω		
V3	5AM8	220Ω	.1Ω	†5100Ω	3Ω	4Ω	†5100Ω	.1Ω	4700Ω	0Ω
V4	6BA8A	0Ω	2.2meg	†470K	5Ω	4Ω	• 50Ω	4700Ω	†1600Ω	†4800Ω
V5	3AU6	†50K	†470Ω	9.5Ω	10.5Ω	240K	†75K	†470Ω		
V6	5U8	†9800Ω	4Ω	†72K	5Ω	6.5Ω	†3800Ω	270Ω	3300Ω	†470K
V7	6BN8	1meg	0Ω	1meg	6.5Ω	8Ω	18K	†220K	6.8meg	0Ω
V8	5AQ5	470K	270Ω	8Ω	9.5Ω	†1600Ω	†1200Ω	470K		
V9	6CM7	‡1800Ω	NC	0Ω	13Ω	11.5Ω	•‡2.5meg	• 1meg	2.2meg	• 2200Ω
V10	6CG7	†33K	400K	0Ω	14.5Ω	13Ω	†470Ω	450K	270K	NC
V11	12DQ6A	NC	14.5Ω	NC	†4700Ω	440K	NC	17Ω	0Ω	TOP CAP ‡81Ω
V12	12D4GT	TP	NC	¶ 100K	NC	†2.4Ω	TP	20Ω	17Ω	
V13	1G3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP ‡550Ω
V14	21CBP4A	11.5Ω	68K	Pin 6 •‡300Ω	Pin 10 ‡35Ω	Pin 11 • 750K	Pin 12 10.5Ω			
V201	2CY5	850K	0Ω	2Ω	1.5Ω	†2500Ω	†13K	0Ω		
V202	5CL8	15K	†19K	0Ω	1.5Ω	0Ω	†3200Ω	†28K	0Ω	220K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

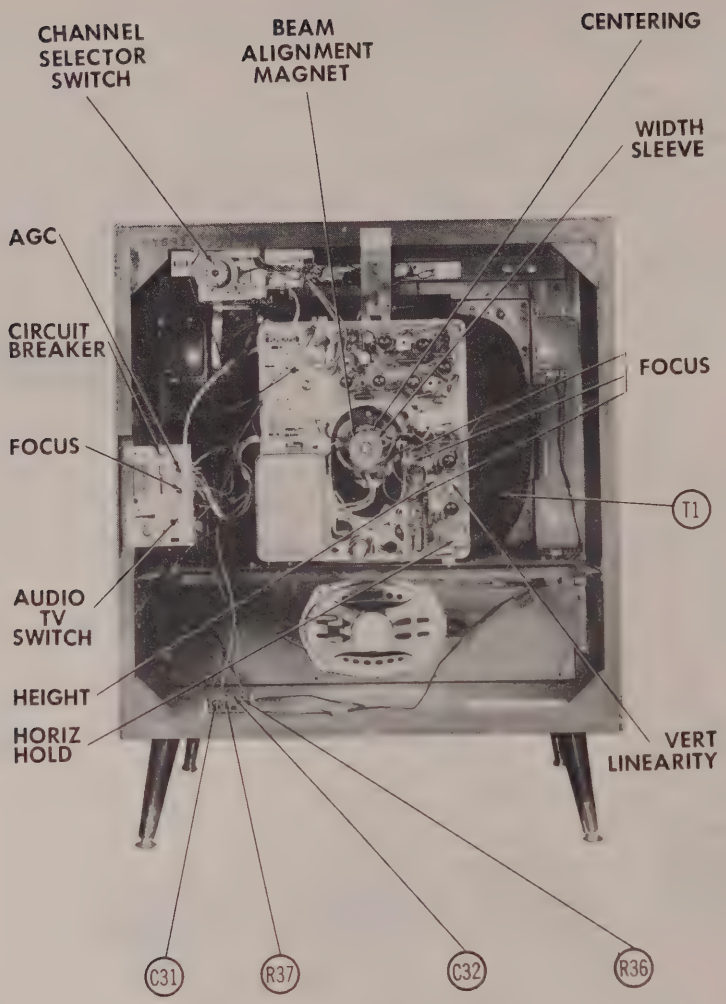
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.

† MEASURED FROM 225V SOURCE. NC NO CONNECTION.

‡ MEASURED FROM PIN 3 OF V12. TP TIE POINT.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a TV station and adjust the Horizontal Hold until the picture synchronizes horizontally. If the picture cannot be synced with the Horizontal Hold, turn the Waveform slug (B1) several turns out of the coil form from its original position. Readjust the Horizontal Hold until the picture synchronizes horizontally.

Connect the vertical amplifier of a scope thru a low capacity probe to Ⓕ. Connect low side to chassis. Retouch the Horizontal Hold to synchronize the picture.

Adjust the Waveform slug (B1) for a waveform similar to Fig. 2 with the sharp peak approximately 10% higher than the broad peak. Keep the picture in sync during this adjustment with the Horizontal Hold. Remove scope connection and retouch Horizontal Hold if necessary to synchronize the picture horizontally.

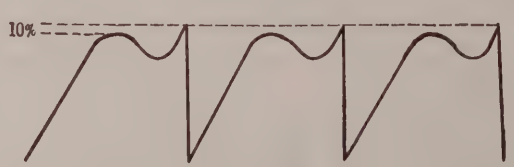


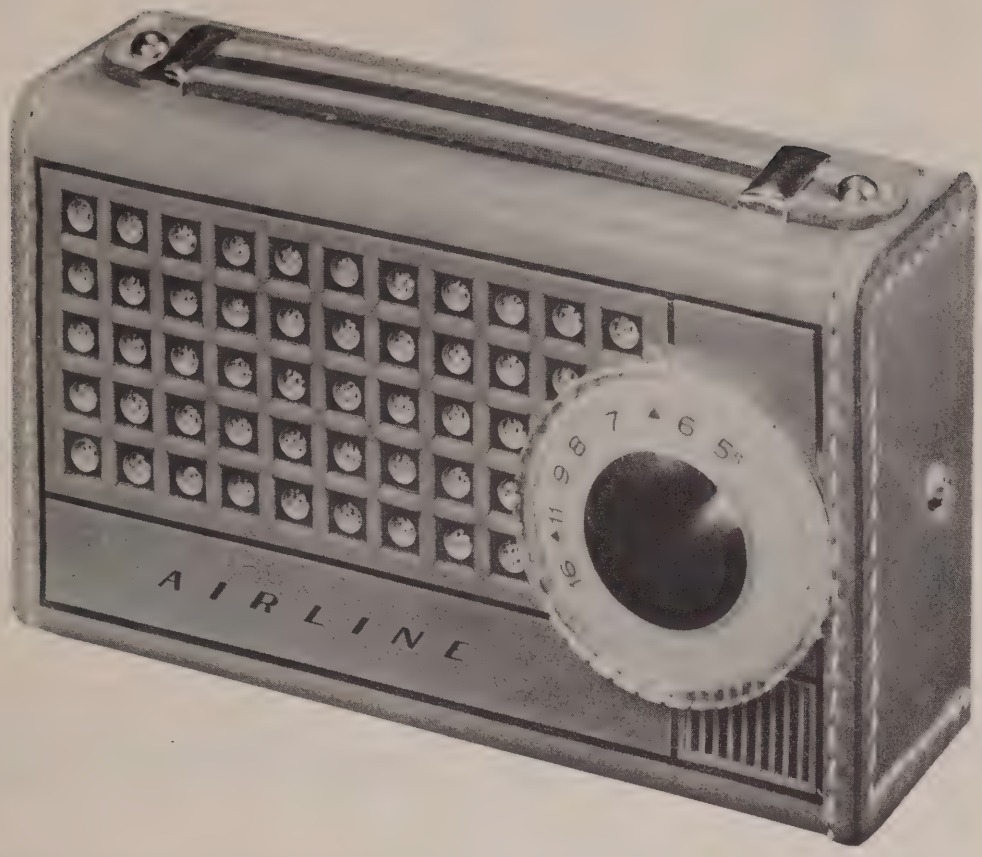
FIG.2

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

AIRLINE MODELS GEN-1106A, GEN-1112A

AIRLINE MODELS
GEN-1106A, GEN-1112A



AIRLINE MODELS
GEN-1106A, GEN-1112A

TRADE NAME	Airline Models GEN-1106A, GEN-1112A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Illinois
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	9 Volts DC
RATING	8.9MA @ 9 Volts DC (No Signal, Min. Volume) 12MA @ 9 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400∿ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1640KC	"	"	A4	"
3.		"	535KC	Tuning gang fully closed	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 2 and 3.
4.		"	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H648

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES	
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.		
X1	2N140	Converter		2N140	2N485		PNP	Note 1
X2	2N139	1st IF Amplifier		2N139	2N482	2N139	PNP	Note 2
X3	2N139	2nd IF Amplifier		2N139	2N482	2N139	PNP	Note 2
X4	2N109	Driver	CBS-2N180	2N109	2N362	2N109	PNP	
X5	2N109	Output	CBS-2N180	2N109	2N632	2N109	PNP	Note 3
X6	2N109	Output	CBS-2N180	2N109	2N632	2N109	PNP	Note 3

Note 1. Model GEN-1112A uses 2N405 in this application.
Note 2. Model GEN-1112A uses 2N407 in this application.
Note 3. Model GEN-1112A uses 2N411 in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	100	10	E3215	PWE10100	NL100-10	TT15X100			TE-1162
C2	4	6	E3216	XPP-6004	NL4-6	TT6X5	ML4-6		TE-1083
C3	4	6	E3216	XPP-6004	NL4-6	TT6X5	ML4-6		TE-1083

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C5	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C6	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C7	91		E3331						5%
C8	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C9	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C10	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C11	39		E3332	NPO-DI39	DTZ-39	C10Q39C			5%
C12	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C13	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C14	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C15	20000			BPD-02	DD-203	BYB6S2		5HK-S2	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2500Ω	1/4	E2520					Volume & Switch

RESISTORS

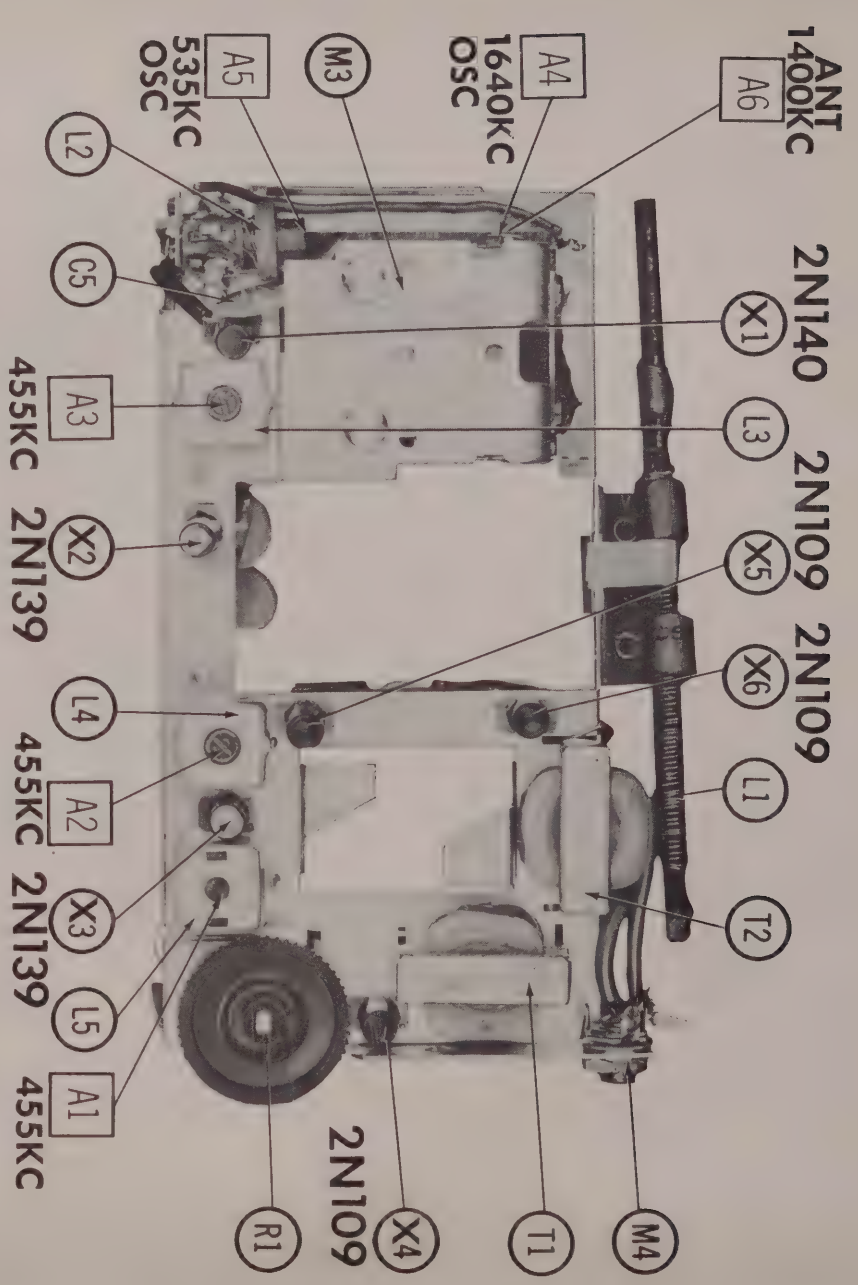
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		AIRLINE PART No.	NOTES
	OHMS	WATT		
R2	33K			
R3	2200Ω			
R4	1000Ω			
R5	390Ω			
R6	470Ω			
R7	12K			
R8	150K			
R9	2200Ω			
R10	240Ω 5%			Note 1
R11	1200Ω			

ITEM No.	RATING		AIRLINE PART No.	NOTES
	OHMS	WATT		
R12	1000Ω			
R13	33K			
R14	150K			
R15	150K			
R16	33K			
R17	470Ω			
R18	150Ω			
R19	8200Ω			
R20	47Ω 5%	1		
R21	100Ω			

Note 1 Not used in some versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		AIRLINE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Stick	E6019					
L2	Osc. Coil	E6128 ▲		BC-403 *			
L3	1st IF	E6215					
L4	2nd IF	E6215					
	2nd IF	E6216					Alternate
L5	3rd IF	E6216					
	3rd IF	E6217					Alternate

▲ Includes C5. * Reduce length of coil form.

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2	: 1	E1116						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	1400Ω CT	20Ω	E1115	GH7			TA-9		TY-44X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	QUAM PART No.	
SP1	2 3/4"	PM	20Ω	E1019		

BATTERIES

ITEM No.	VOLTAGE	AIRLINE PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	62-96		P6		226		M1600	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		AIRLINE PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N295		1N60	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M3	Tuning Cap.	E3520	2 Gang (Ant. 27-257mmf, Osc. 12-123mmf.)
M4	Jack	E636	Miniature, Earphone

CABINETS & CABINET PARTS

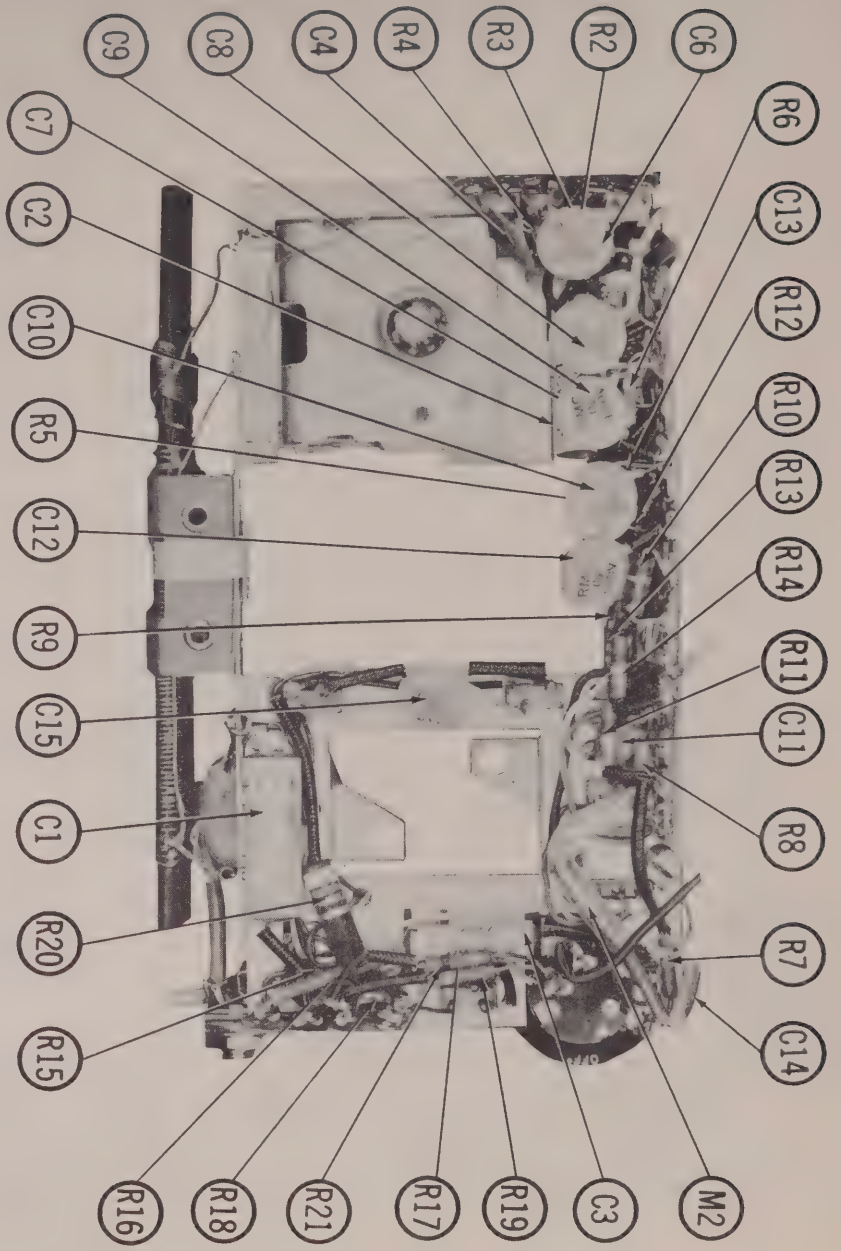
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	E5053	Tuning
Knob	E5054	On-Off-Volume
Cabinet	E7032	Includes Handle

WIRING DATA

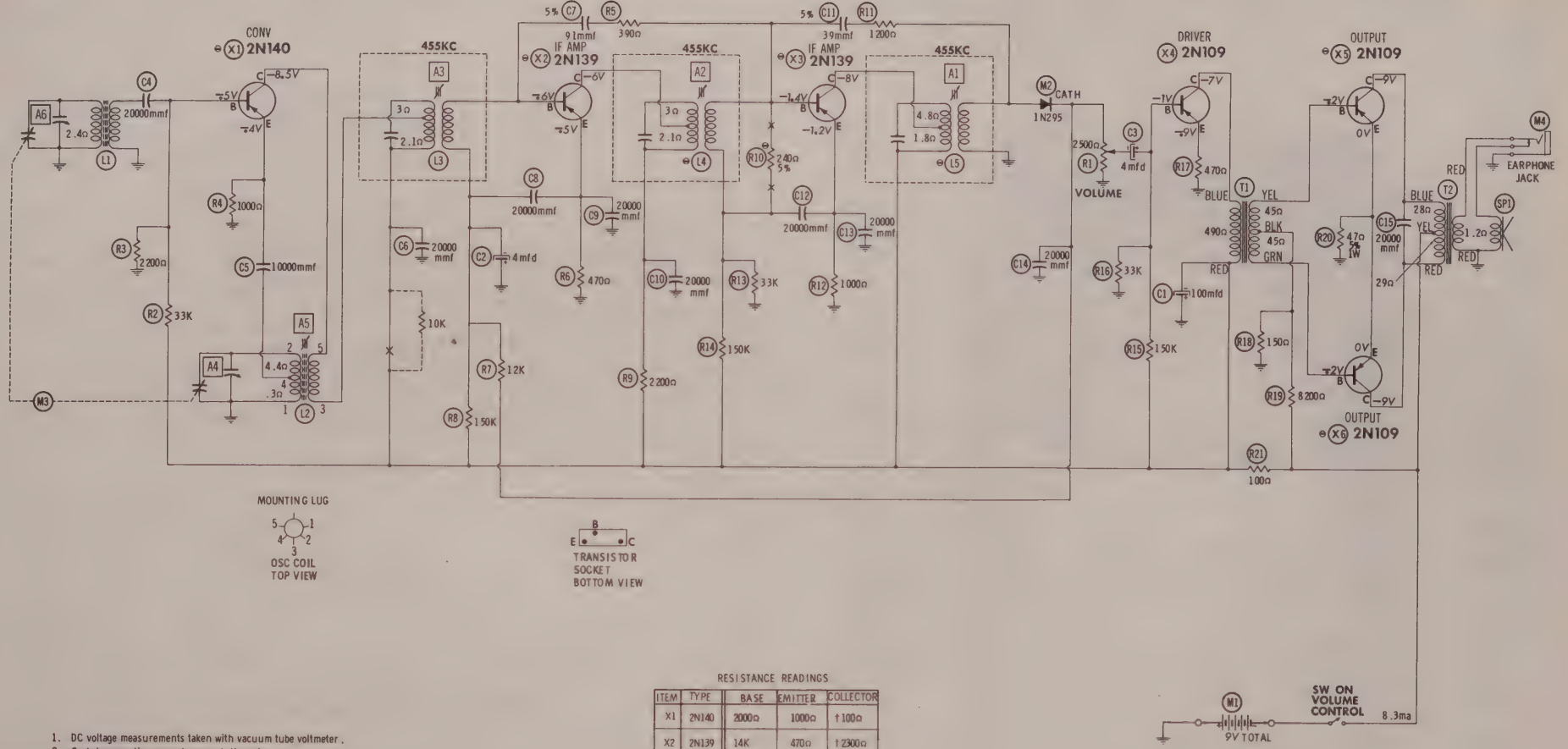
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—BOTTOM VIEW



AIRLINE MODELS
GEN-1106A, GEN-1112A

FOLDER 4



RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	2N140	2000Ω	1000Ω	†100Ω
X2	2N139	14K	470Ω	†2300Ω
X3	2N139	33K	1000Ω	†100Ω
X4	2N109	33K	470Ω	†590Ω
X5	2N109	190Ω	4.7Ω	†28Ω
X6	2N109	190Ω	4.7Ω	†29Ω

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
† MEASURED FROM JUNCTION OF R19 AND R21.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

AIRLINE MODELS GEN-2510A, GEN-2511A, GEN-2650A, GEN-2651A

AIRLINE MODELS GEN-2510A, GEN-2511A, GEN-2650A, GEN-2651A

AIRLINE MODELS GEN-2510A, GEN-2511A, GEN-2650A, GEN-2651A

TRADE NAME	Airline Models GEN-2510A, GEN-2511A, GEN-2650A, GEN-2651A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Illinois
TYPE SET	AC Operated AM Receiver With 4 Speed Automatic Record Changer
TUBES (Six)	Types 6BE6 Converter, 6BA6 IF Amplifier, ECC83/12AX7 AF Amp.-Phase Inv., (2) 6BQ5/EL84 Output, 6AX5GT Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles — RATING .57 Amp. @ 117 Volts AC (51 Watts Less Motor)
TUNING RANGE—BROADCAST	538-1640KC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE V-M 1200A - PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 6BE6 (V1). Low side to chassis.	455KC (400∿ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.		Loop	1640KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output
3.		"	1400KC	Tune to 1400KC signal	"	A6	"

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	Converter	6BE6
V2	IF Amplifier	6BA6
V3	AF Amp. -Phase Inv.	ECC83/12AX7 ①
V4	Output	6BQ5/EL84
V5	Output	6BQ5/EL84
V6	Rectifier	6AX5GT

① Domestic types listed may not be directly interchangeable in some instances.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▬40	350	E3220	AFH3-43	C0340	FP376.8	TMT-38	T-165	R2697 *
B	■40	350							
C	▲10	350							
C2	50	25	E3221	PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C4	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C5	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C6	.01	400		P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C7	.02	400		P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C8	2000			BPD-002	DD-202	BYA10D2	UC-522	5HK-D2	
C9	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C10	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C11	.02	400		P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C12	100			BPD-0001	DD-101	L10T1	UC-531	5GA-T1	
C13	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C14	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C15	2.0	50	E3026						
C16	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2meg	½	E2523	B-75	A47-2meg-S	Q11-139	U56	Loudness
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	500K	½	E2524					Treble
B	Switch							Phono-Radio
R3A	5meg	½	E2522	B-87	A47-5meg-S	Q11-141	U67	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	Power On-Off

* Use KR with CRL "red label" controls and KB with "blue label" controls.

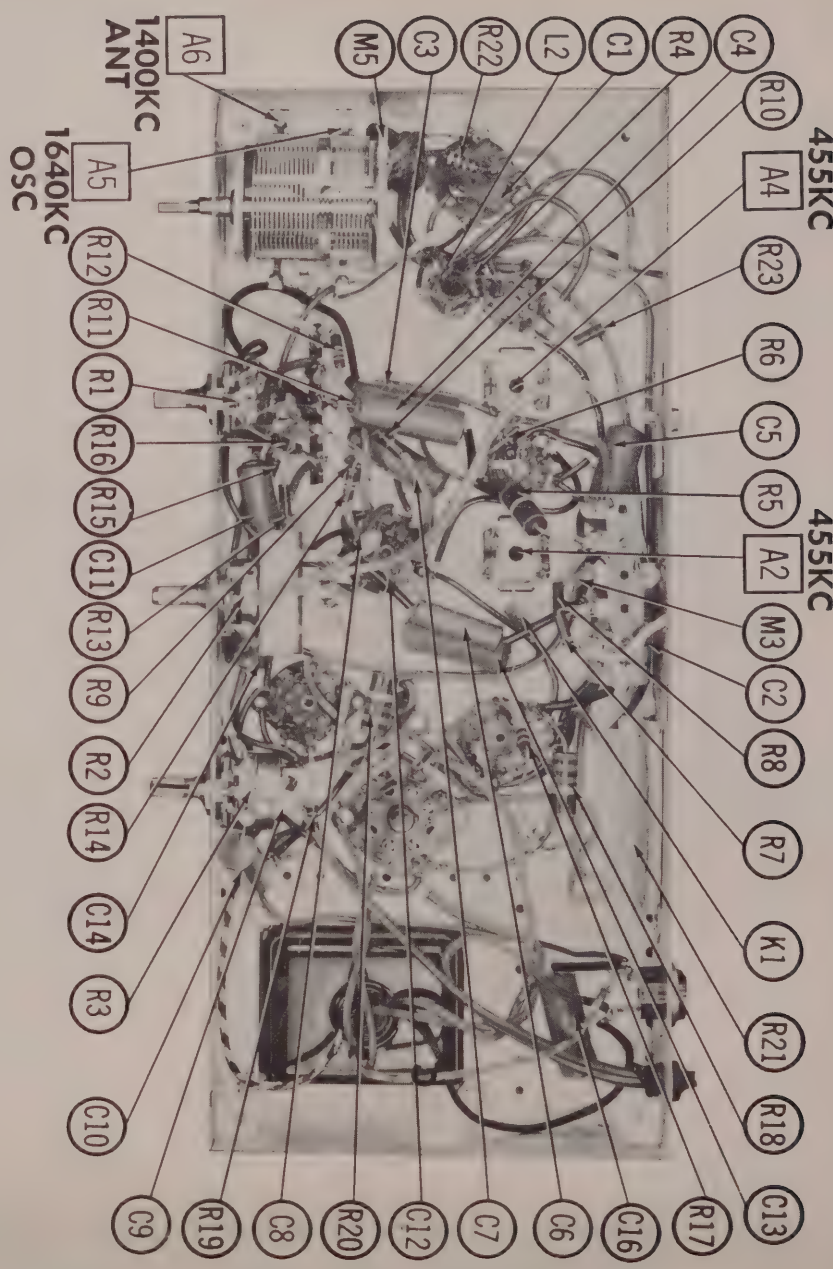
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		AIRLINE PART No.	NOTES
	OHMS	WATT		
R4	22K			
R5	10K	2		
R6	220Ω			
R7	3.3meg			
R8	1meg			
R9	220K			
R10	2700Ω			
R11	1meg			
R12	270K			
R13	1meg			

ITEM No.	RATING		AIRLINE PART No.	NOTES
	OHMS	WATT		
R14	100K			
R15	1000Ω			
R16	100K			
R17	330K			
R18	180Ω	2		
R19	330K			
R20	2700Ω	2		
R21	750Ω	10		
R22	47K			
R23	10Ω			

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		AIRLINE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Stick						
L2	Osc. Coil	E6127X		BC-393 *	69-OSC *		
L3	Input IF	E622	16-6758	BC-352	12-C1	RF-1	
L4	Output IF	E622	16-6758	BC-353	12-C2	RF-2	

* Drill new mounting hole.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .57A	580VCT @ .065A	6.3V @ 3.6A	E1118					22R02	R-5B

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5500Ω CT With screen taps @ 700Ω from CT	6-8Ω	E1119							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	QUAM PART No.	
SP1	3"x14"	PM	6-8Ω	E1021		
SP2	4"	PM	8-10Ω	E1022	4A1TZ8	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	AIRLINE PART No.	REPLACEMENT DATA	
C1	Diode RF Filter	150mmf, 150mmf, 47K	E3320	Aerovox	PA-98
				Centralab	PC-51
				Cornell-Dubilier	111TM2
				Sprague	D-2

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	AIRLINE PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		81-TB				

PHONO NEEDLE

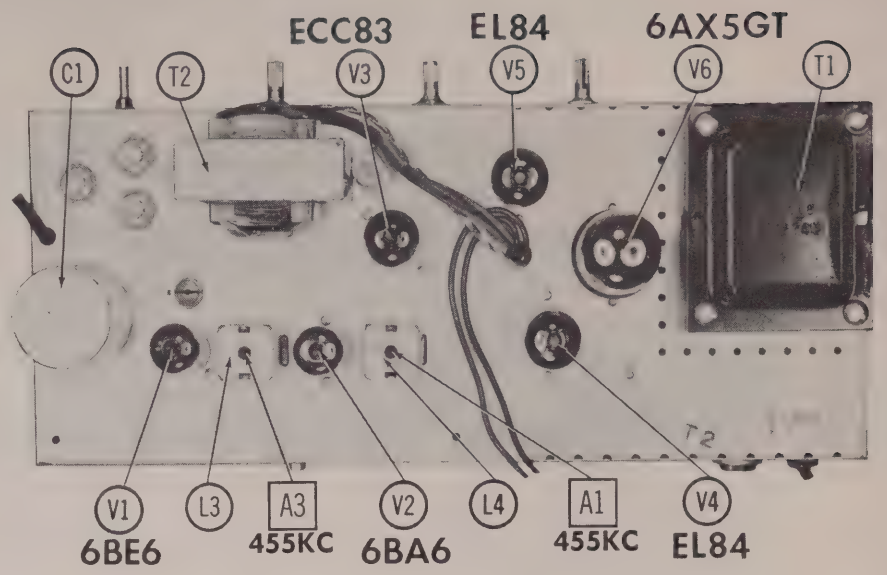
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	AIRLINE PART No.	JENSEN PART No.	WALCO PART No.	
M2				

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		AIRLINE PART No.	CBS PART No.	SYLVANIA PART No.	
M3	1N295		1N60	1N295	Detector (Pigtail)

CHASSIS—TOP VIEW



MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M4	Lamp		#47 (Specify Color)
M5	Tuning Cap.	E3521	2 Gang (Ant. 30-398mmf, Osc. 11-135mmf)

CABINETS & CABINET PARTS

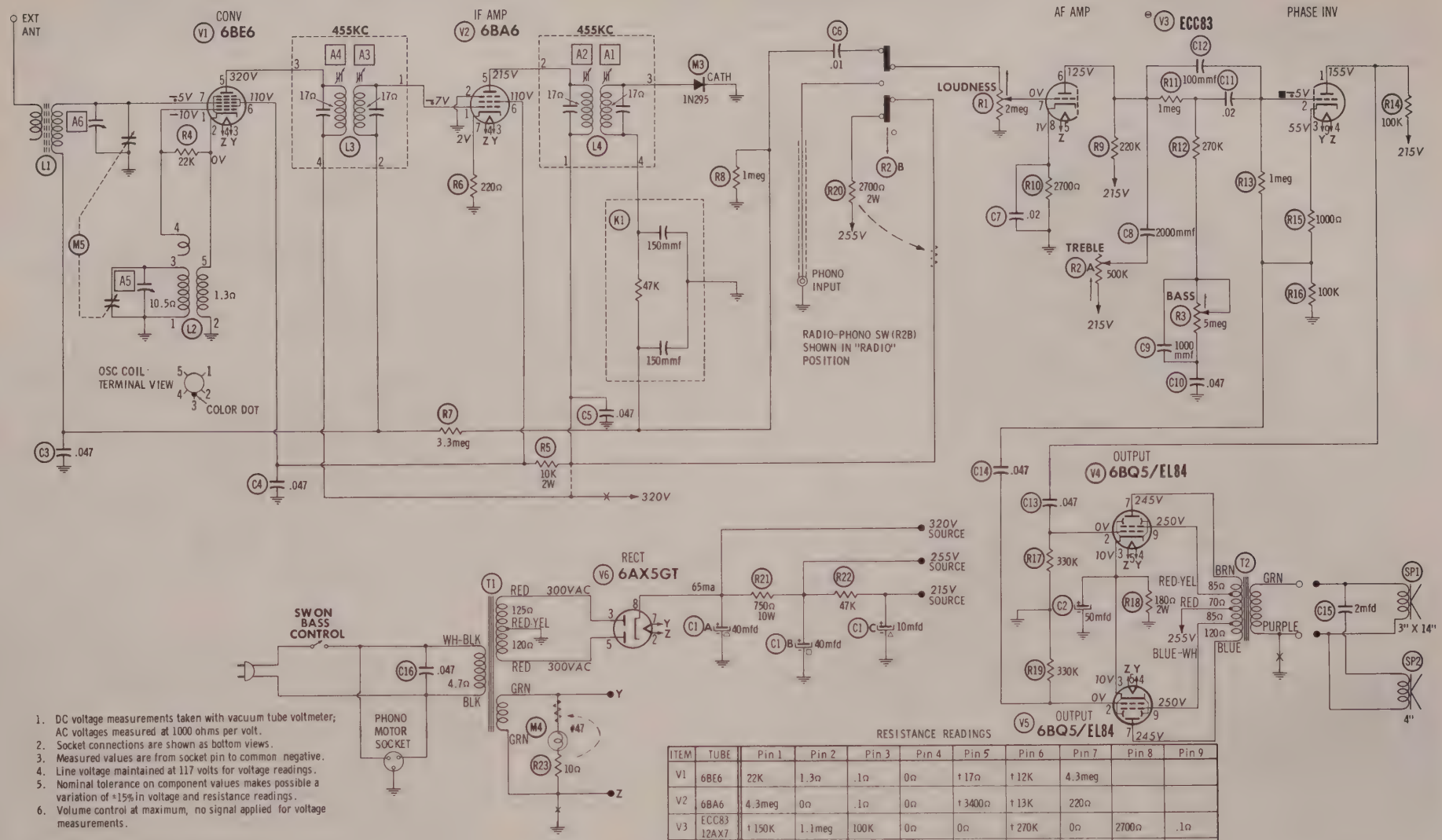
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	E5072-B	Tuning, Model 2651A
Skirt	E5073	Tuning, Models 2651A, 2650A
Knob	E5072-LB	Tuning, Model 2650A
Knob	E5069	Tuning, Models 2510A, 2511A
Skirt	E5070	Tuning, Models 2510A, 2511A
Knob	E5071-B	Control, 3 Used, Model 2651A
Knob	E5071-LB	Control, 3 Used, Model 2650A
Knob	E5068	Control, 3 Used, Model 2510A, 2511A

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

AIRLINE MODELS GEN-2510A, GEN-2511A, GEN-2650A, GEN-2651A
FOLDER 5



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BE6	22K	1.3Ω	.1Ω	0Ω	†17Ω	†12K	4.3meg		
V2	6BA6	4.3meg	0Ω	.1Ω	0Ω	†3400Ω	†13K	220Ω		
V3	ECC83 12AX7	†150K	1.1meg	100K	0Ω	0Ω	†270K	0Ω	2700Ω	.1Ω
V4	6BQ5 EL84	NC	330K	180Ω	.1Ω	0Ω	NC	†900Ω	NC	†820Ω
V5	6BQ5 EL84	NC	330K	180Ω	.1Ω	0Ω	NC	†950Ω	NC	†835Ω
V6	6AX5GT	NC	0Ω	125Ω	NC	120Ω	TP	.1Ω	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 8 OF V6.
■ MEASURED FROM PIN 3 OF V3.
NC NO CONNECTION.
TP TIE POINT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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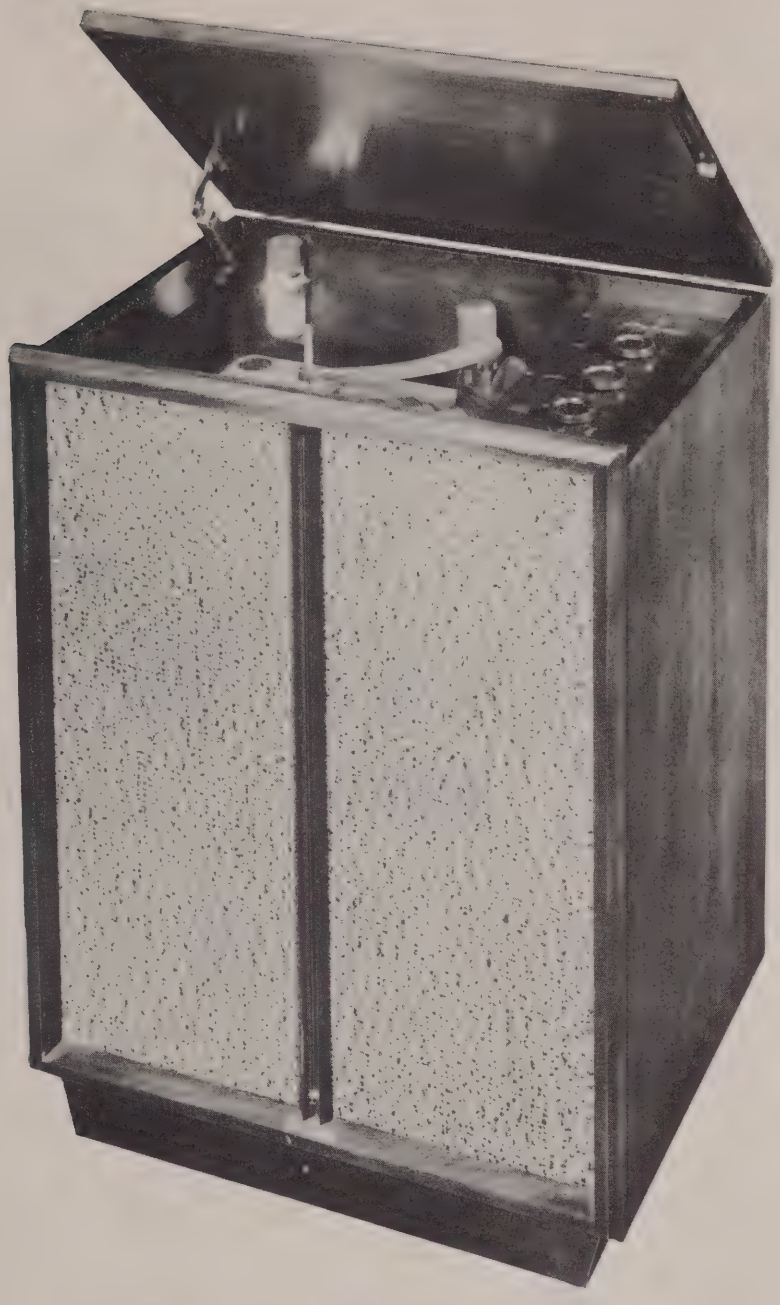
PHOTOFACT* Folder

ANDREA MODEL 2CP-12WA (Ch. P-12WA)

ANDREA MODEL
2CP-12WA (Ch. P-12WA)



ANDREA MODEL
2CP-12WA (Ch. P-12WA)

TRADE NAME	Andrea Model 2CP-12WA (Ch. P-12WA)
MANUFACTURER	Andrea Radio Corp., 27-01 Bridge Plaza North, Long Island City, 1, N.Y.
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES (Four)	Types 6AN8 AF Amp.-Phase Inv., (2) 6V6GT Output, 6AX5GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .56 Amp. @ 117 Volts AC (57 Watts)

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR COLLARO RC-456 - PHOTOFACT SET 342 FOLDER 3 ON RECORD CHANGER MANUAL RC-10.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp. - Phase Inv.	6AN8	
V2	Output	6V6GT	

ITEM No.	USE	TYPE	NOTES
V3	Output	6V6GT	
V4	Rectifier	6AX5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	ANDREA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▬40	450	HCE-1345	AFH4-74	D0650	FP431.2		Q-385	R2235 *
B	▬40	450							
C	▲10	450							
D	20	25							
C2	6	10AC	HCE-1343	AC-PRS10V8	BBR12-150 † BBR12-150 †	TC43 † TC43 †	TD-12-150 † TD-12-150 †	MT-1512 † MT-1512 †	

† Connect negative leads together. * Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	ANDREA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	33		HCC-1962	NPO-DI 33	DD-330	L10Q33	ZT-5433	5TCC-Q33	10%
C4	47		HCC-1961	NPO-DI 47	DD-470	L10Q47		5TCC-Q47	10%
C5	2000		HCC-1954						10%
C6	470		HCC-1959		MD-471				10%
C7	.01	600	HCT-1008	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C8	.022	600	HCT-1050	P688N-022		CUB6S22	GEM-6122	6TM-S22	
C9	.15	200	HCT-1051				GEM-2015		10%
C10	.04	200	HCT-1052				GEM-1614		10%
C11	.05	600	HCT-1012	P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C12	.05	600	HCT-1012	P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C13	10000	1400	HCC-1963	DAC-27		HVE16S1		20HKB-S1	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	ANDREA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	GRV-850	BT-175		Q13-139XX	UDT-296	Loudness, Taps @ 400K & 800K
B	Shaft			Not Req.		Not Req.	Not Req.	
R2A	3meg	½	GRV-852	B-84	A47-3meg-S	Q11-140	U59	Bass
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	1meg	½	GRV-854	B-69	A47-1meg-S	Q11-137	U54	Treble
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	Power On-Off

* Use KR with CRL "red label" controls and KB with "blue label" controls.

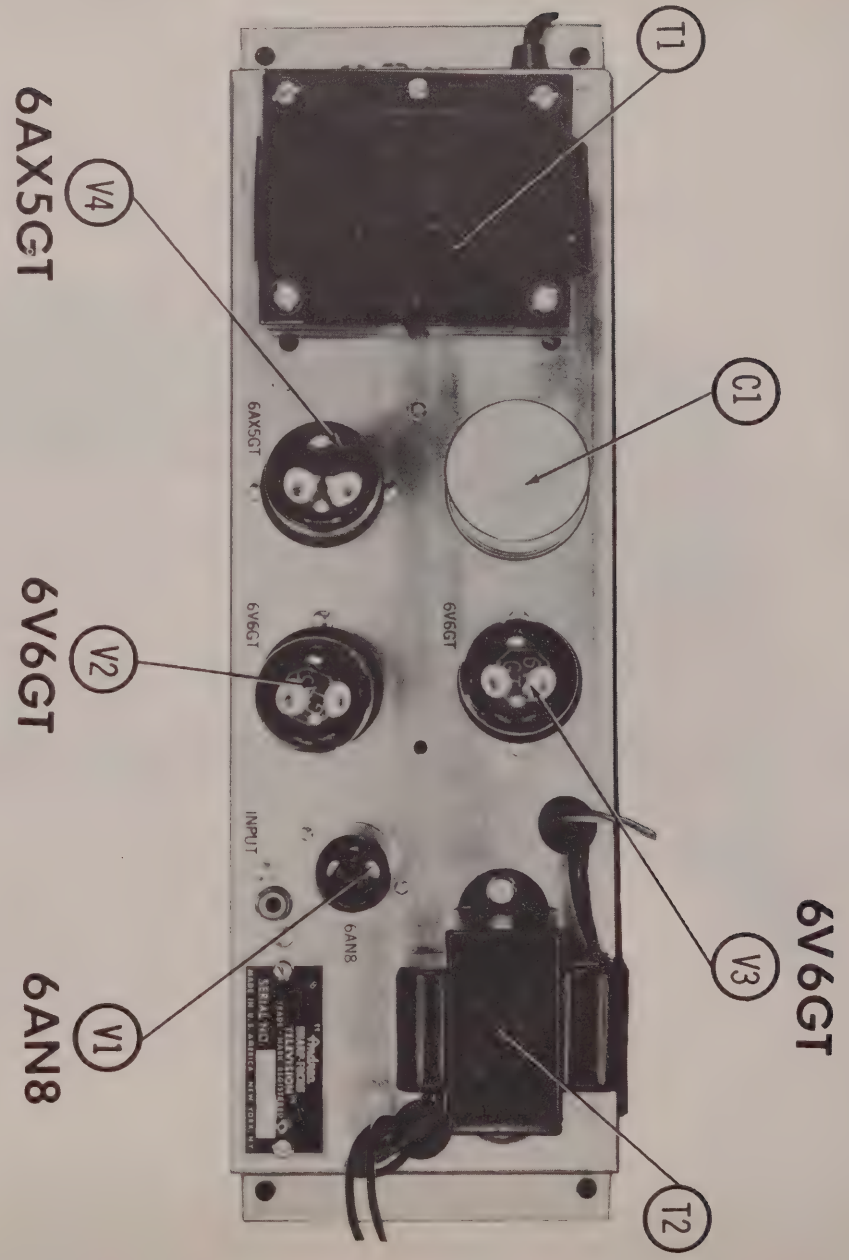
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ANDREA PART No.	NOTES
R4	120K		GRC-280	
R5	33K		GRC-203	
R6	91K 5%		GRC-371	
R7	330K		GRC-301	
R8	470Ω		GRC-213	
R9	8200Ω		GRC-285	
R10	33K		GRC-203	

ITEM No.	RATING OHMS	RATING WATT	ANDREA PART No.	NOTES
R11	33K		GRC-203	
R12	330K		GRC-301	
R13	270Ω 10%	5(WW)	GRW-553	
R14	330K		GRC-301	
R15	3900Ω	1	GRC-351	
R16	10K		GRC-304	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	ANDREA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @.56A	660VCT @.076A	6.3VCT @3.3A	ST-3073-1		P-2951 ①				

① Tape 5V winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ANDREA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6300Ω CT	3-4Ω	ST-3076-1	Z1002	A-2901	AU-604	A-3823	24S61	S-55Z	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ANDREA PART No.	QUAM PART No.	
SP1	12"	PM	6-8Ω	SL-4035	12A31PA	
SP2	6"	PM	6-8Ω	SL-4034	6A21Z6	
SP3	4"	PM	6-8Ω	SL-4032	4A15TZ6.4	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	ANDREA PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	FM-5434	55-T or 81-TB	GD-J			

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	ANDREA PART No.	JENSEN PART No.	WALCO PART No.	
M2	FM-5434-1	†JPS-35 or †♦JPS-35DS or ♦JPS-35D	†W-35TPS or †♦W-35DS or ♦W-35TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	ANDREA PART No.	NOTES
M3	Lamp		#47
	Plug	FM-5360	Phono
	Plug	FM-5066	Control Chassis
	Receptacle	FM-615	Control Chassis
	Receptacle	FM-5361	Phono
	Receptacle	FM-5162	AC, Chassis Type

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

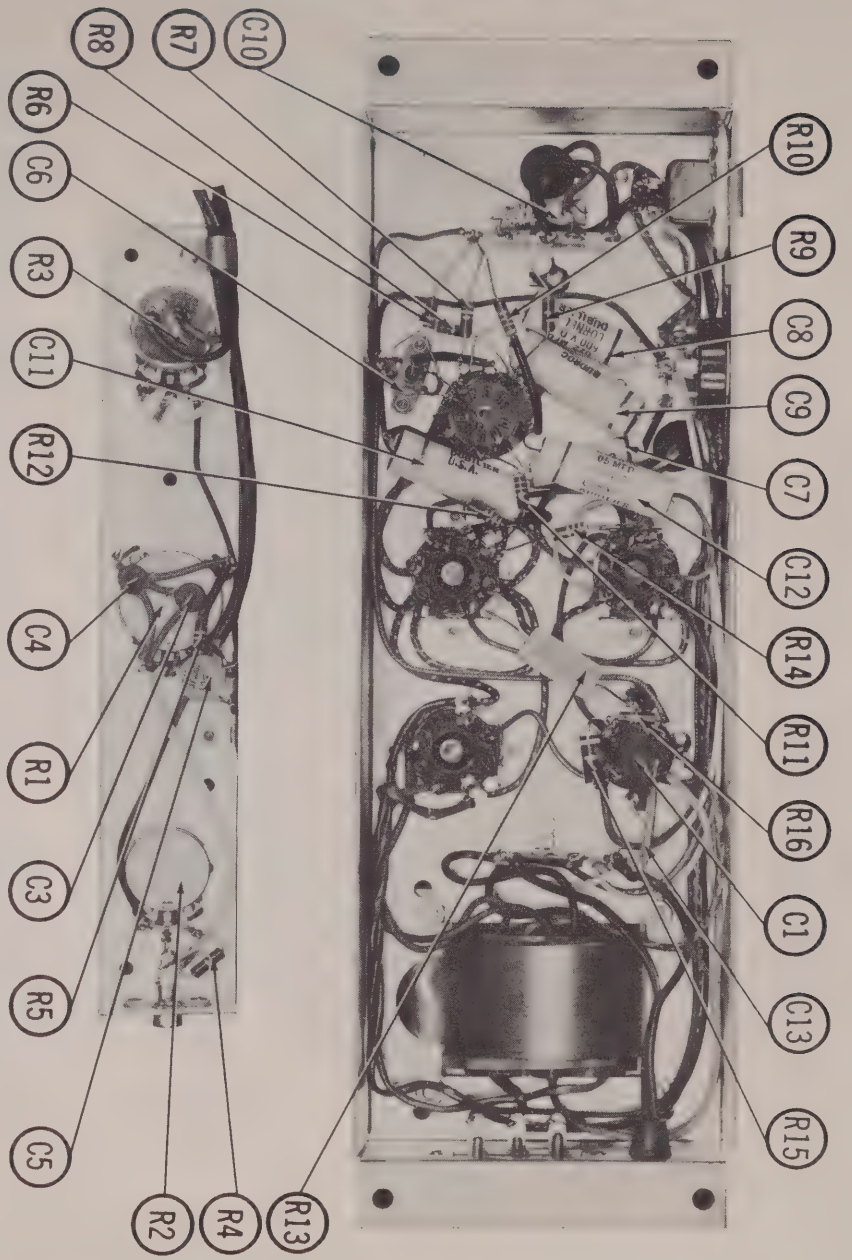
NAME	PART NO.	DESCRIPTION
Knob	FM-5457	3 Used

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

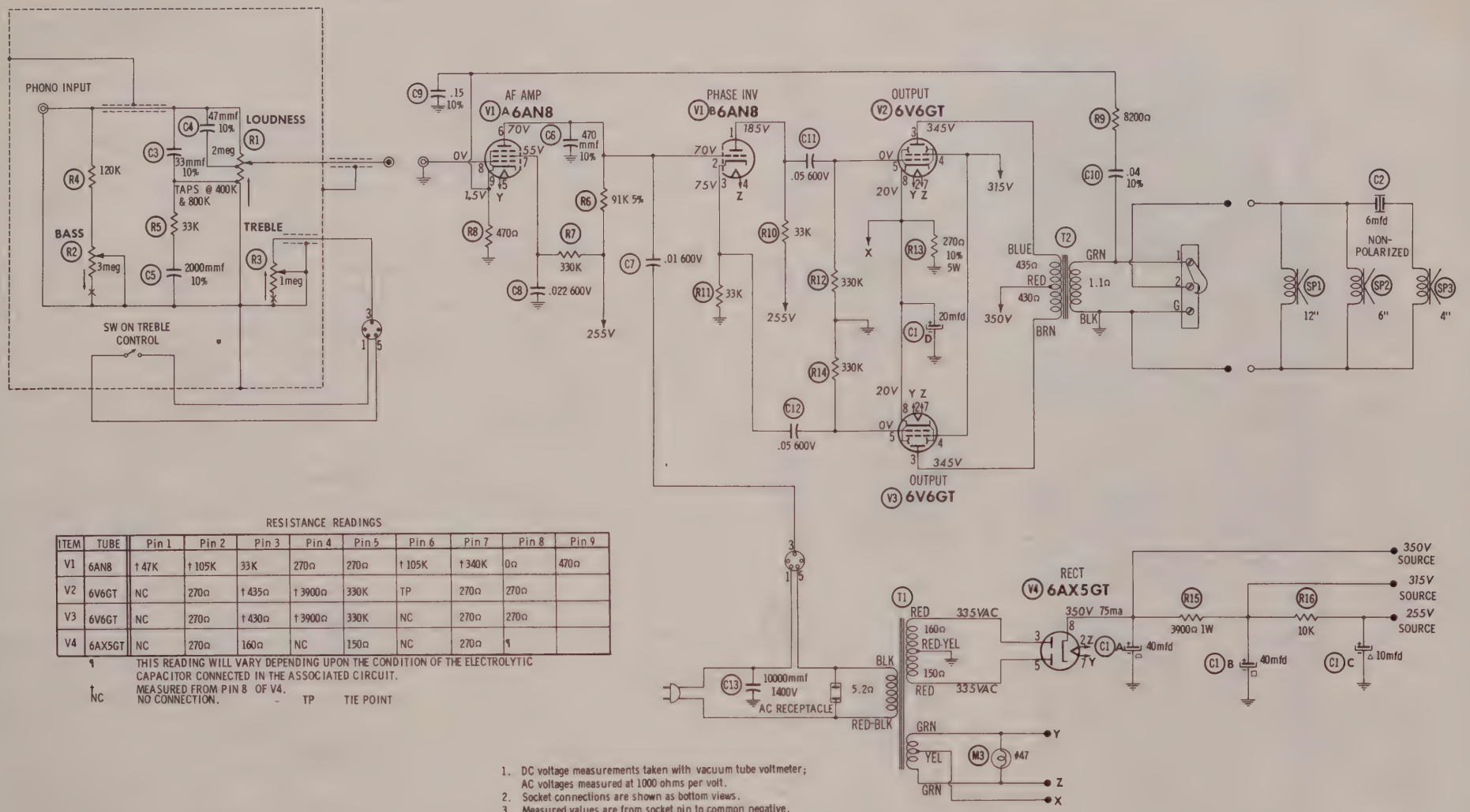
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW



ANDREA MODEL
2CP-12WA (Ch. P-12WA)

ANDREA MODEL
2CP-12WA (Ch. P-12WA)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AN8	†47K	†105K	33K	270Ω	270Ω	†105K	†340K	0Ω	470Ω
V2	6V6GT	NC	270Ω	†435Ω	†3900Ω	330K	TP	270Ω	270Ω	
V3	6V6GT	NC	270Ω	†430Ω	†3900Ω	330K	NC	270Ω	270Ω	
V4	6AX5GT	NC	270Ω	160Ω	NC	150Ω	NC	270Ω	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM PIN 8 OF V4.

NC NO CONNECTION. TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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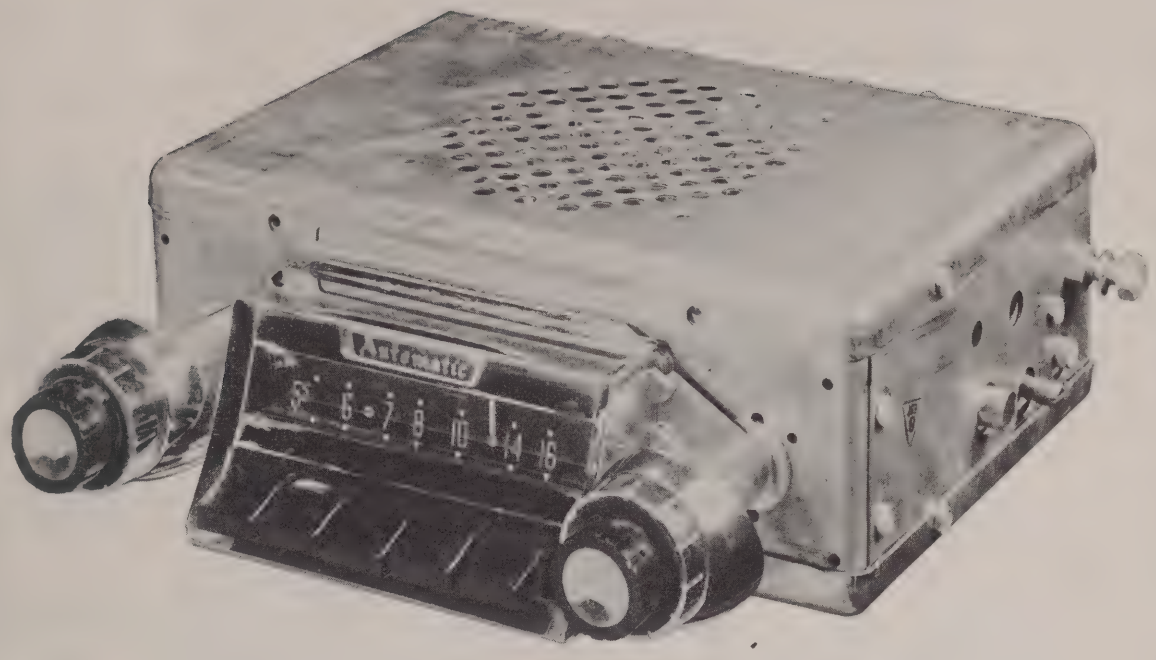
PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

AUTOMATIC MODELS
CTR-77A, FTP-37A

AUTOMATIC MODELS
CTR-77A, FTP-37A



TRADE NAME	Automatic Models CTR-77A (For 1957 Chevrolet Automobiles), FTP-37A (For 1957 Ford Automobiles)
MANUFACTURER	Automatic Radio Mfg. Co., Inc., 122 Brookline Ave., Boston 15, Mass.
TYPE SET	Battery Operated Custom Built AM Automobile Receiver With Transistorized Output
TUBES (Four)	Types 12AF6 RF Amplifier, 12AD6 Converter, 12AF6 IF Amplifier, 12J8 Det.-AVC-AF Amplifier
POWER SUPPLY	12 Volt Storage Battery
RATING	1.3 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	538 - 1610KC

AUTOMATIC MODELS
CTR-77A, FTP-37A

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 12AD6 (V2). Low side to chassis.	265KC (400∿ Mod.)	High frequency end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	68mmf	High side to antenna receptacle. Low side to chassis.	1610KC	1610KC	"	A5, A6, A7	"
3.	"	"	600KC	600KC	"	A8, A9, A10	Adjust for maximum output. Repeat steps 2 and 3.
4.	With radio installed in car and antenna fully extended, tune in a weak station near 1500KC and adjust A7 for maximum output.						

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H695

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12AF6	
V2	Converter	12AD6	
V3	IF Amplifier	12AF6	
V4	Det.-AVC-AF Amp.	12J8	

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N176 *	Output	CBS-2N155	2N176		2N176	

* Alternate type 2N257 or equivalent.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	AUTOMATIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■500	15	20-315	AFH2-02-75	B0045	WP200.7			R2699 *
B	▲150	15							
C2	750	3	20-757	PRS6V1000	BR1000-6	TC310	TD-1000-6	MTH-06100	R2701 *

* Non-Catalog Item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	AUTOMATIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.047	200	30-473-2	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C4	40		15-400						NPO
C5	2-36		28-800						
C6	27		15-270	DI-000027	DD-270	L10Q27	UC-5427	5GA-Q27	
C7	40		15-400						NPO
C8	51		15-510N						N750 10%
C9	33-285		28-281						①
C10	3-45		28-400						
C11	10000		15-103	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C12	27		15-270	DI-000027	DD-270	L10Q27	UC-5427	5GA-Q27	
C13	2000			BPD-002	DD-202	BYA10D2	DC522	5HK-D2	②
C14	10000		15-103	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C15	10000		15-103	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C16	.47	100	30-474-1	P288N-47		CUB2P47	GEM-2047	2TM-P47	
C17									

① Alternate Part #28-3 used in some versions.
② Some versions may use 1500mmf in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AUTOMATIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2meg	½	80A656A ①				■ UE3840S	Tone
B	1meg	½						Volume, Tap ② 350K
C	Switch							
R2	500Ω	2(WW)	62-501		39-500		FL-600	Transistor Bias

① Part #80A618 used in Model FTP-37A. ■ "STA-LOC" Equivalent : FK26A, OS2312, RU16T354, IS2750, US-41

RESISTORS

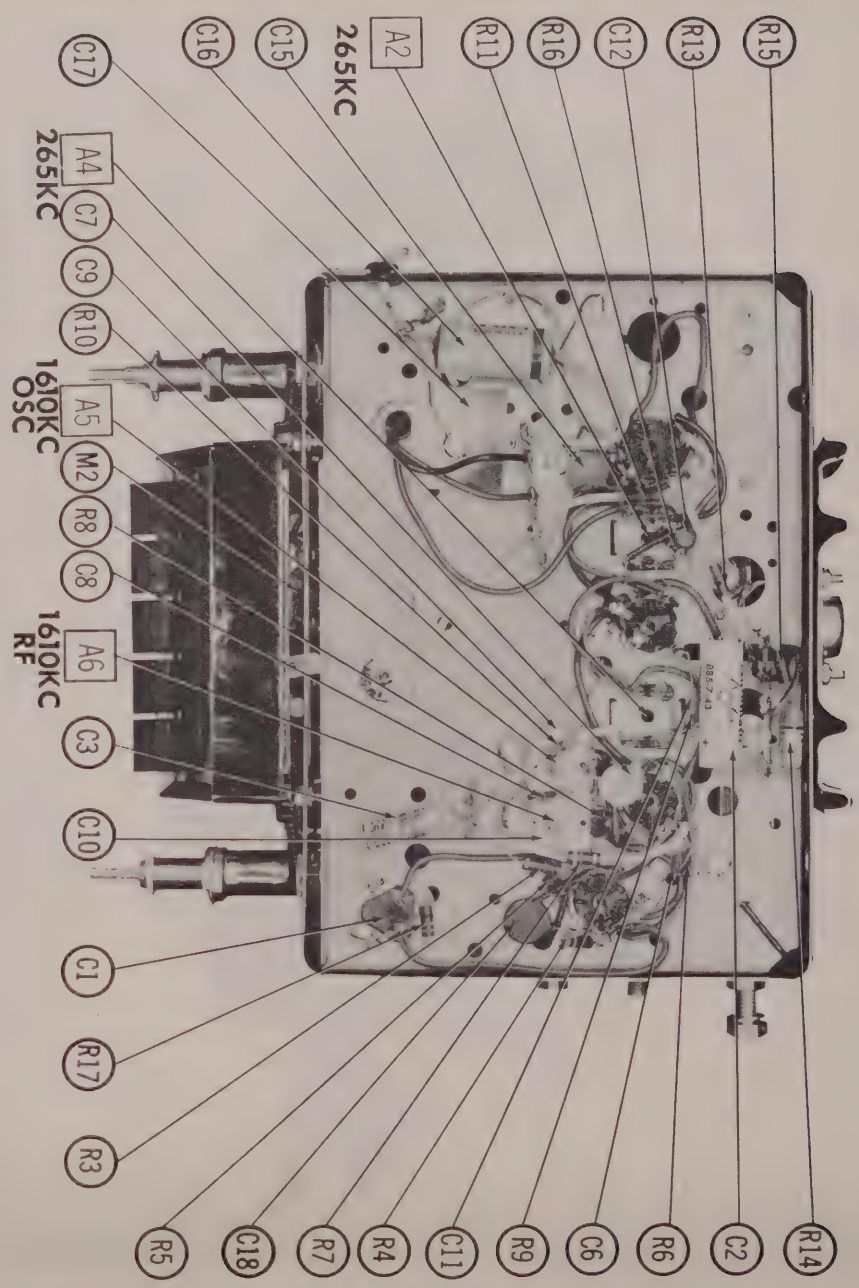
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		AUTOMATIC PART No.	NOTES
	OHMS	WATT		
R3	1500Ω		60-152S	
R4	330Ω			①
R5	150K		60-154S	
R6	2.2meg		60-225S	
R7	4.7meg		60-475S	
R8	47K		60-473	
R9	10meg		60-106	
R10	10meg		60-106	②

ITEM No.	RATING		AUTOMATIC PART No.	NOTES
	OHMS	WATT		
R11	1meg		60-105	③
R12	100K		60-104	
R13	10meg		60-106	
R14	1Ω	1	60-1	
R15	22Ω		60-220	
R16	47K		60-473	①
R17	68Ω		60-680S	

① Not used in some versions. ② Some versions may use 2.2meg (Part #60-225S) or 100K (Part #60-104) in this application.
③ Some versions may use 1.2meg in this application (Part #60-125).

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		AUTOMATIC PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Antenna Coil	‡					‡ Part of M3.
L2	RF Coil	‡					‡ Part of M3.
L3	Osc. Coil	‡					‡ Part of M3.
L4	Input IF	14-265	16-6752	BC-350	12-H6	RF-3	
L5	Output IF	14-267	16-6754	BC-354	12-H6		
L6	"A" Lead Choke						1.2 Microhenries

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~)	AUTOMATIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L7	1.3A @ 12.6VAC	9Ω	.008 Hy.	75A601						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	AUTOMATIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	15	: 1	75A602A ①						① Alternate Part #75A604.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	AUTOMATIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	20Ω	3-4Ω	75A603							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AUTOMATIC PART No.	QUAM PART No.	
SP1	6" x 9"	PM	3-4Ω	73-902	69A3	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	AUTOMATIC PART No.	REPLACEMENT DATA
K1	Antenna Isolation	100mmf, 1.2meg	①	

① Some versions may use a 100mmf (Part #25-101) and a 1.2meg (Part #60-125) in this application.

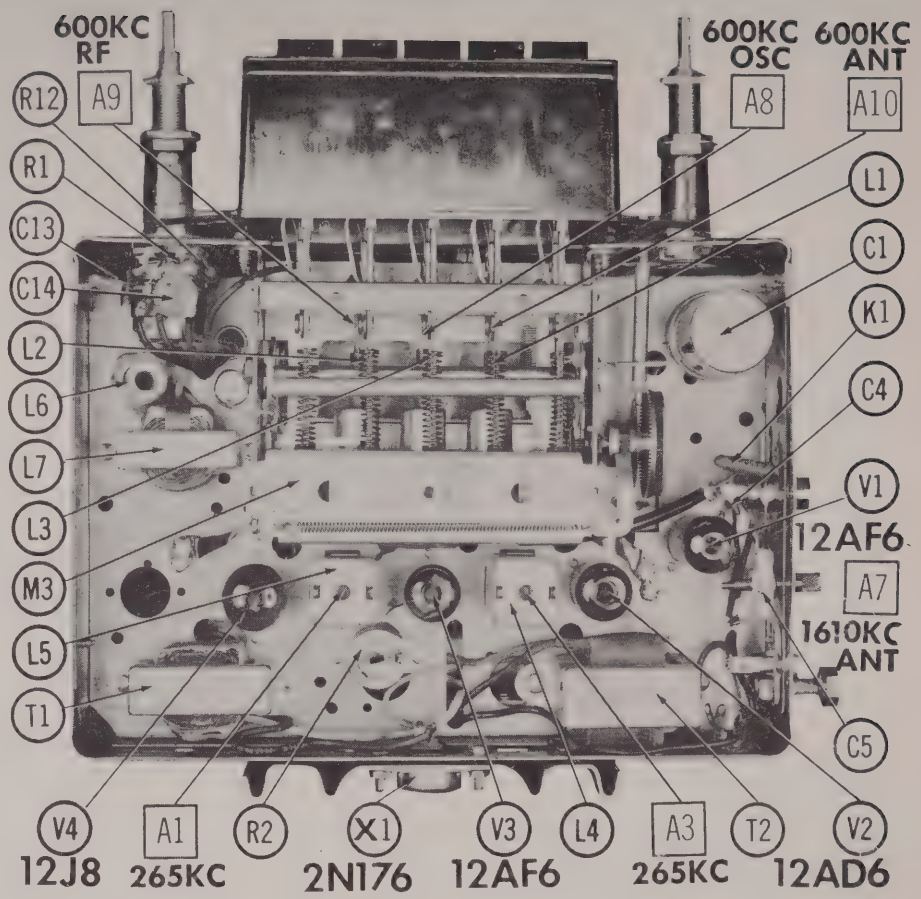
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			AUTOMATIC PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1		7/4A 32V	108-100					

MISCELLANEOUS

ITEM No.	PART NAME	AUTOMATIC PART No.	NOTES
M2	Lamp	1891	#1891
M3	Tuner	78-77/T	(Specify Letter) Model CTR-77A
	Tuner	78-69/R	(Specify Letter) Model FTP-37A

CHASSIS—TOP VIEW



CABINETS & CABINET PARTS

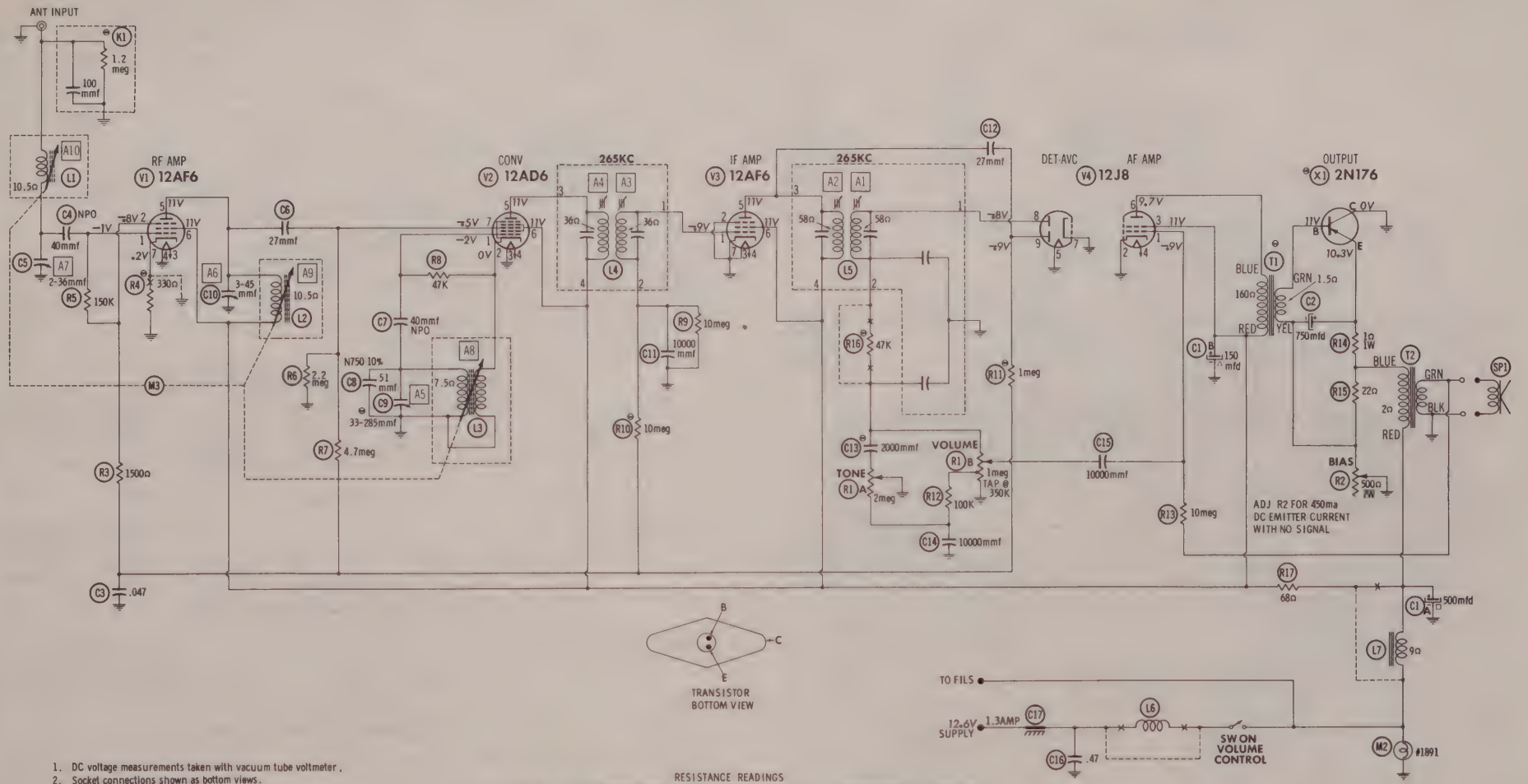
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	47-10	Tuning, On-Off-Volume, Model CTR-77A
Knob	47-148	Control, two used, Model FTP-37A
Knob	48A648	Tone, Model CTR-77A
Knob	48B393	Tone, Model FTP-37A
Knob	48A648-1	Dummy, Model CTR-77A
Knob	48B393-1	Dummy, Model FTP-37A
Cover	52B323	Case, Top
Cover	52B626	Case, Bottom
Pointer	84A517	
Scale	39-77	Dial

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

AUTOMATIC MODELS CTR-77A, FTP-37A FOLDER 7



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes posssible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AF6	5.5meg	5.4meg	1.5Ω	0Ω	†78Ω	†68Ω	330Ω		
V2	12AD6	47K	.7Ω	0Ω	1.5Ω	†103Ω	†68Ω	1.8meg		
V3	12AF6	7meg	0Ω	0Ω	1.5Ω	†126Ω	†86Ω	0Ω		
V4	12J8	10meg	0Ω	†68Ω	1.5Ω	0Ω	†228Ω	0Ω	1meg	6meg

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE

† MEASURED FROM POSITIVE TERMINAL OF C1A

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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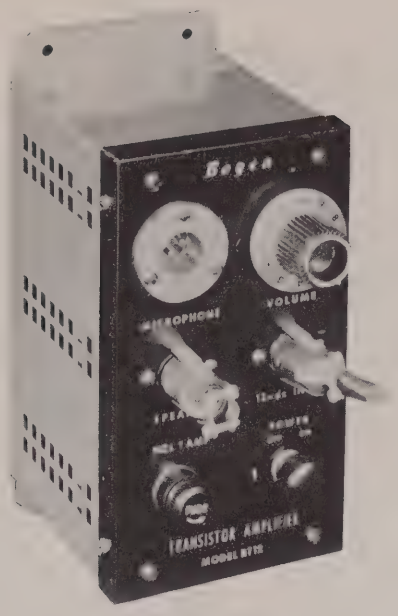
PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

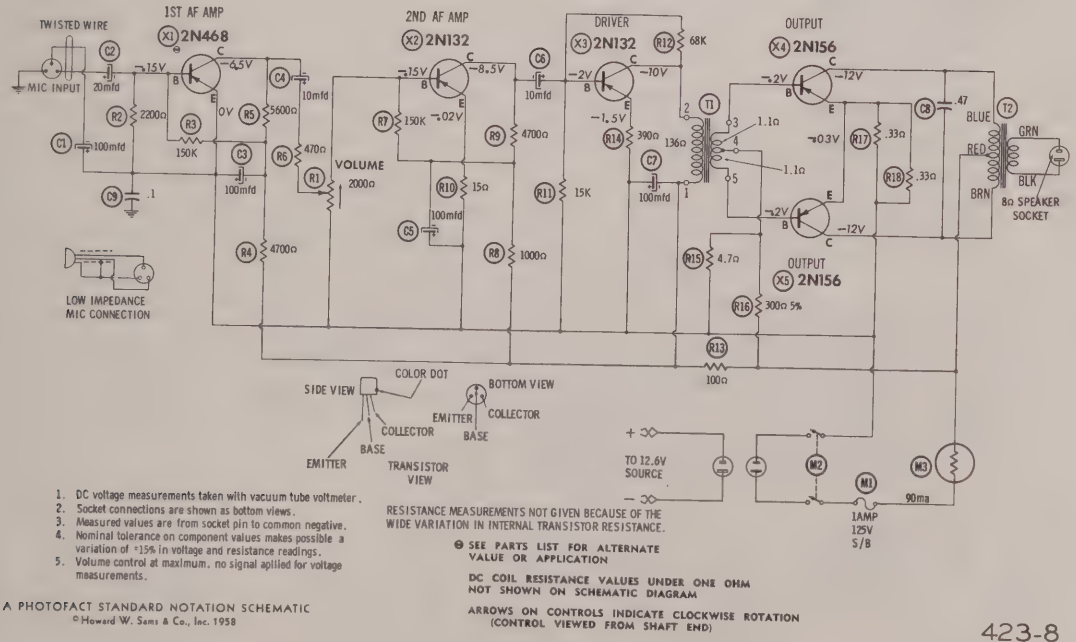
DAVID BOGEN MODEL BT12

DAVID BOGEN MODEL
BT12



TRADE NAME	David Bogen MODEL BT12	
MANUFACTURER	David Bogen Co., P. O. Box 500, Paramus, N. Y.	
TYPE SET	Battery Operated Transistorized Audio Amplifier	
POWER SUPPLY	12 Volt Storage Battery	RATING .09 Amp. @ 12.6 Volts DC (No Signal, Min. Volume) .60 Amp. @ 12.6 Volts DC (Signal, Normal Volume)

DAVID BOGEN MODEL
BT12



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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423-8

SET 423 FOLDER 8

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PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N468	1st AF Amp.			2N422		PNP ①
X2	2N132	2nd AF Amp.			2N466	2N109	PNP
X3	2N132	Driver			2N466	2N109	PNP
X4	2N156	Output	2N156			2N242	PNP
X5	2N156	Output	2N156			2N242	PNP

① Alternate type 2N132.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	David Bogen PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	100	25		PRS25V100	BBR100-25	TC2501	TD-100-25	MTH-2510	TVA-1207
C2	20	50		PRS50V20	BBR20-150	TT50X20	TD-20-150	MT-0520	TVA-1410
C3	100	25		PRS25V100	BBR100-25	TC2501	TD-100-25	MTH-2510	TVA-1207
C4	10	25		PRS25V10	BBR10-25	TT50X10	TD-10-25	MT-0210	TVA-1204
C5	100	25		PRS25V100	BBR100-25	TC2501	TD-100-25	MTH-2510	TVA-1207
C6	10	25		PRS25V10	BBR10-25	TT50X10	TD-10-25	MT-0210	TVA-1204
C7	100	25		PRS25V100	BBR100-25	TC2501	TD-100-25	MTH-2510	TVA-1207

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	David Bogen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C8	.47	200		P288N-47		CUB2P47	GEM-2047	2TM-P47	
C9	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	David Bogen PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2000Ω	½	V402A			Q13-111		Volume

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		David Bogen PART No.	NOTES
	OHMS	WATT		
R2	2200Ω			
R3	150K			
R4	4700Ω			
R5	5600Ω			
R6	470Ω			
R7	150K			
R8	1000Ω			
R9	4700Ω			
R10	15Ω			

ITEM No.	RATING		David Bogen PART No.	NOTES
	OHMS	WATT		
R11	15K			
R12	68K			
R13	100Ω			
R14	390Ω			
R15	4.7Ω	(WW)		
R16	300Ω 5%			
R17	.33Ω	(WW)		
R18	.33Ω	(WW)		

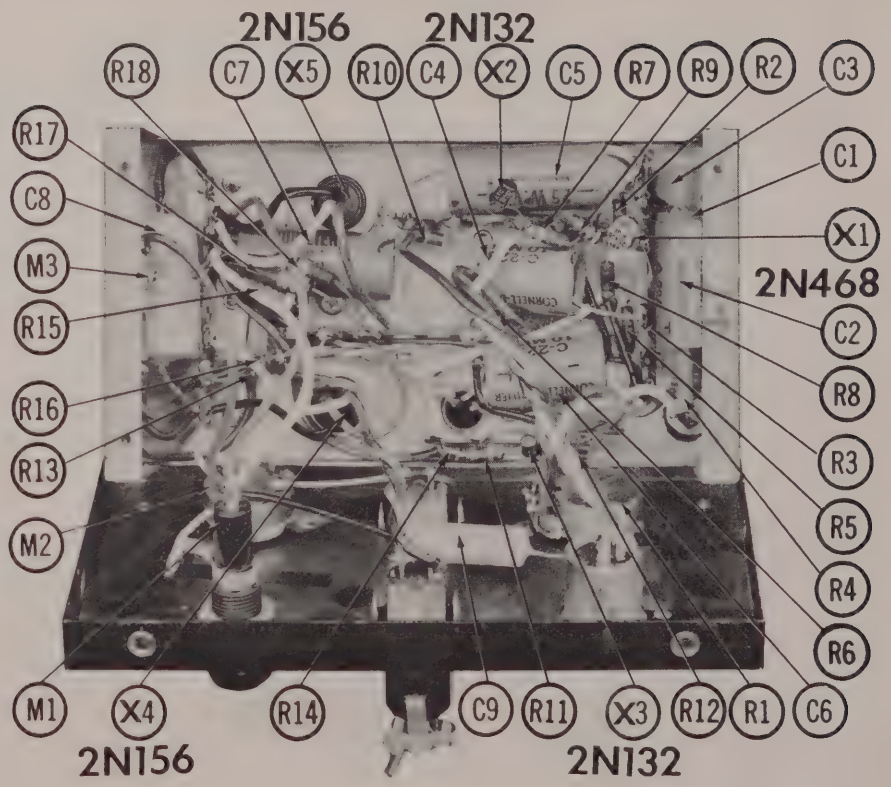
TRANSFORMER (DRIVER)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	4200Ω	100Ω CT	T264						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	50Ω CT	8Ω	T2125					TR-61 ①		① Drill new mounting hole.

CHASSIS—BOTTOM VIEW



FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			David Bogen PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1A 125V S/B	MDL		313001. (1A 125V S/B)	342001	MDL 1	HKP

MISCELLANEOUS

ITEM No.	PART NAME	David Bogen PART No.	NOTES
M2 M3	Switch Thermostat	H613	Power On-Off, DPDT , Rotary, Snap Type

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

PHOTOFACT* Folder

DAVID BOGEN MODEL KO30

DAVID BOGEN MODEL KO30

DAVID BOGEN MODEL KO30

TRADE NAME	David Bogen Model KO30
MANUFACTURER	David Bogen Co., P. O. Box 500, Paramus, N. J.
TYPE SET	AC Operated 30 Watt Audio Amplifier
TUBES (Five)	Types 6U8A AF Amp.-Phase Inv., (2) 6AV5GA Output, 6CG7 Volt. Regulator, 5U4GB Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .65 Amp. @ 117 Volts AC (65 Watts)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp. - Phase Inv.	6U8A	
V2	Output	6AV5GA	
V3	Output	6AV5GA	

ITEM No.	USE	TYPE	NOTES
V4	Volt Regulator	6CG7	
V5	Rectifier	5U4GB	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	David Bogen PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	30	400		AFH1-51	A0470	FP145	TMS-56	S-265	TVL-1720
C2	30	400		AFH1-51	A0470	FP145	TMS-56	S-265	TVL-1720
C3A	▲20	450		AFH2-69	B0500	FP434	TMD-61	D-270	TVL-2935
B	▲20	450							
C4	50	100		PRS150V50	BR5015	TC49	TD-50-150	MT-1550	TVA-1414

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	David Bogen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	.033	200		P288N-033	DF-303	CUB6S33	GEM-4133	6TM-S33	
C6	150			BPD-00015	DD-151	L10T15	UC-5315	5GA-T15	10%
C7	.1	600		P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C8	.1	600		P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C9	3300								10%
C10	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C11	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C12	.047	600		P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	David Bogen PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	V275B	AB-60	A47-500K-Z	Q13-133	TA55A	Volume
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R2A	100K	½	V392A	AB-40	A47-100K-S	B11-128	TA15L	Volt Reg Adj
B	Shaft			AK-1	FKS-1/4	TM1-K1t	Not Req.	

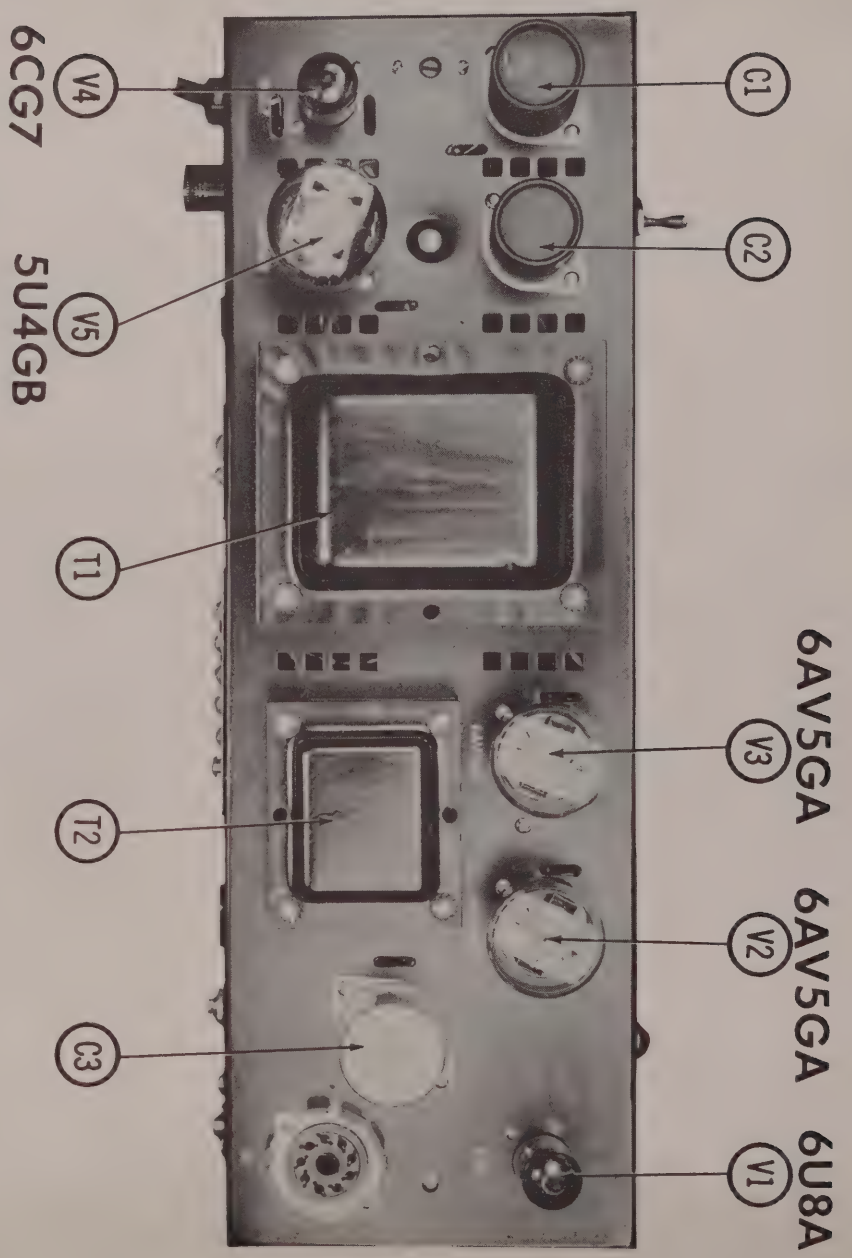
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		David Bogen PART No.	NOTES
	OHMS	WATT		
R3	470K			
R4	15K			
R5	390K			
R6	390Ω			
R7	150K	2		
R8	150K			
R9	15K			
R10	18K			
R11	100K			
R12	27K	2		
R13	220K			
R14	15Ω 5%			

ITEM No.	RATING		David Bogen PART No.	NOTES
	OHMS	WATT		
R15	220K			
R16	1000Ω	7		
R17	15Ω 5%			
R18	68K			
R19	2.7meg 5%			
R20	680K			
R21	1meg			
R22	1meg			
R23	1meg			
R24	68K	2		
R25	4.7Ω	(WW)		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .65A	860VCT @ .070A Tap @ 38V @ .001A	5V @ 4A	T3154						
	SEC. 3	SEC. 4	SEC. 5							
	6.3VCT @ 4.5A									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.1	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5000Ω CT	16Ω 70V	T2128							
		SEC.2								
		16Ω Tap @ 8Ω, 4Ω								

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	David Bogen PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.0005A	H373	1159	D-5410	10	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			David Bogen PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	3A 125V S/B			313003. (3A 125V S/B)	342001	MDX3	HKP

MISCELLANEOUS

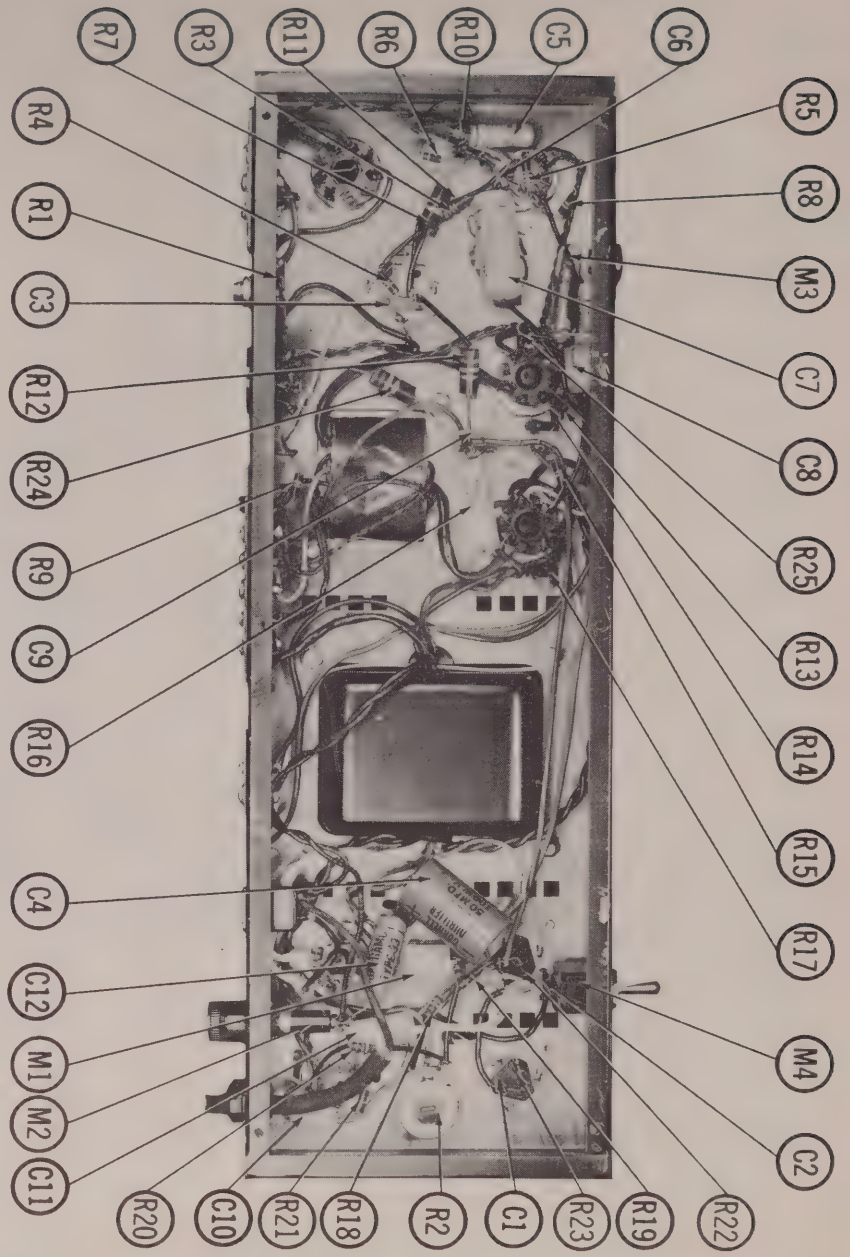
ITEM No.	PART NAME	David Bogen PART No.	NOTES
M3	Lamp		#47
M4	Switch	S191A	Power On-Off, SPST Toggle

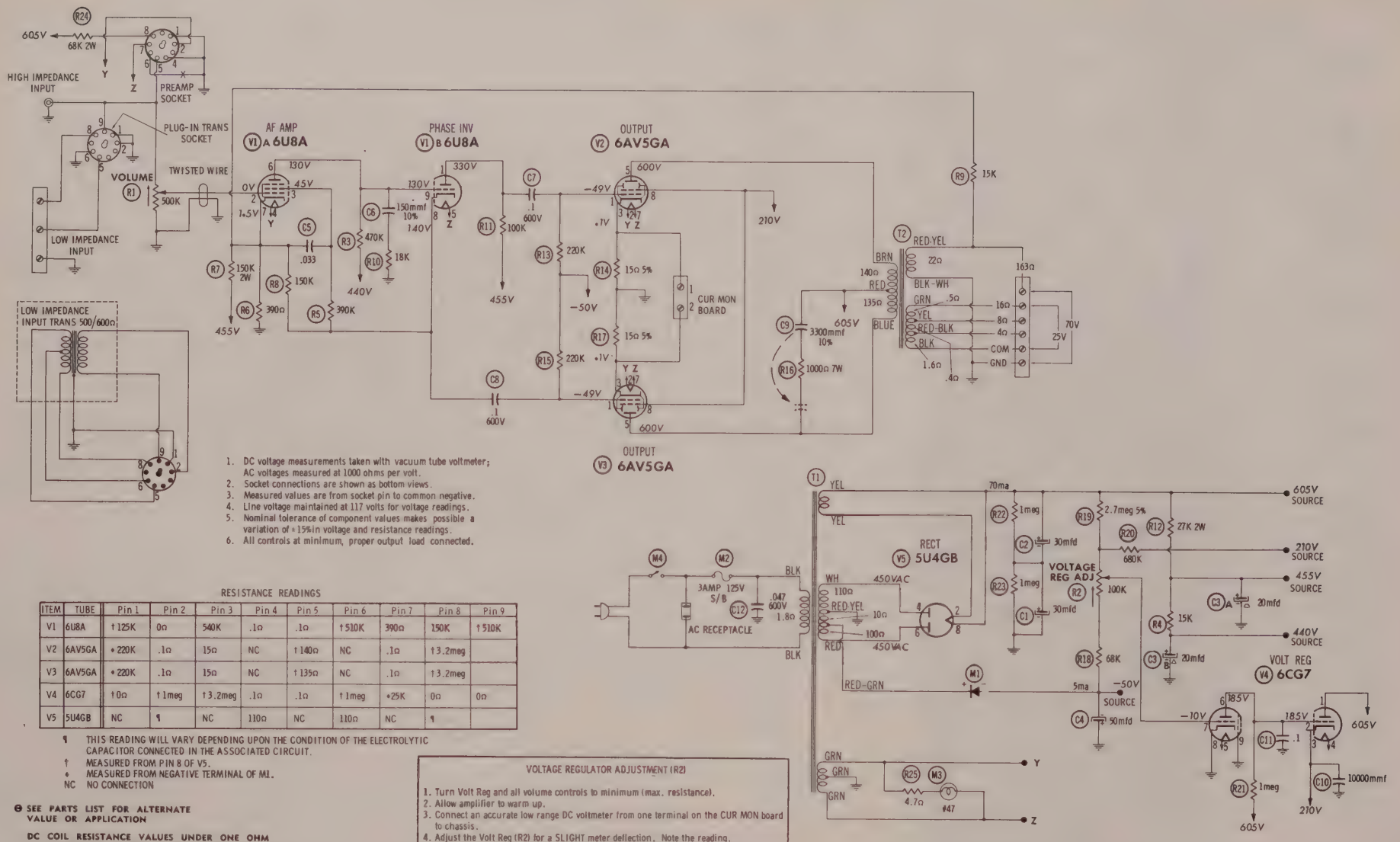
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6U8A	†125K	0Ω	540K	.1Ω	.1Ω	†510K	390Ω	150K	†510K
V2	6AV5GA	•220K	.1Ω	15Ω	NC	†140Ω	NC	.1Ω	†3.2meg	
V3	6AV5GA	•220K	.1Ω	15Ω	NC	†135Ω	NC	.1Ω	†3.2meg	
V4	6CG7	†0Ω	†1meg	†3.2meg	.1Ω	.1Ω	†1meg	•25K	0Ω	0Ω
V5	5U4GB	NC	¶	NC	110Ω	NC	110Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 8 OF V5.
• MEASURED FROM NEGATIVE TERMINAL OF M1.
NC NO CONNECTION

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

VOLTAGE REGULATOR ADJUSTMENT (R2)

1. Turn Volt Reg and all volume controls to minimum (max. resistance).
2. Allow amplifier to warm up.
3. Connect an accurate low range DC voltmeter from one terminal on the CUR MON board to chassis.
4. Adjust the Volt Reg (R2) for a SLIGHT meter deflection. Note the reading.
5. Measure the voltage at the other terminal of the CUR MON board.
6. Keep the meter connected to that terminal which indicates the highest voltage.
7. Adjust the Volt Reg (R2) for a meter reading of .25 volts DC.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PHOTOFACT* Folder
*TRADE MARK
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

DEWALD MODELS L-547, L-548

DEWALD MODELS L-547, L-548

DEWALD MODELS L-547, L-548

TRADE NAME	DeWald MODELS L-547, L-548
MANUFACTURER	DeWald Radio Mfg. Corp., 35-15 37th Ave., Long Island City 1, N.Y.
TYPE SET	AC Operated AM Receiver (Model L-548 is Clock Version)
TUBES (Five)	Types 12BA6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .275 Amp. @ 117 Volts AC (25 Watts Less Clock)
TUNING RANGE—BROADCAST	535-1660KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	High side to pin 1 (grid) of 12BA6 (V1). Low side to B-.	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.		Loop	1650KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	"	"	A6	"

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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SET 423 FOLDER 10

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BA6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amp.	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	DEWALD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	30	150	E-205-4	PRS150V3030	BBRD3315	TCD47	TDLD-4	MTD-1530	TVA-2434
B	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	DEWALD PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	22			SI 22	D6-220	LT6Q22	UC-5422	5GA-Q22	
C3	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C4	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C5	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C6	.05	400		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C7	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DEWALD PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2meg	½	3043-B2	B-76	A47-2meg-Z	QI3-139	U55	Volume, Note 1
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

Note 1. Part #3046-7 may be used in some versions.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

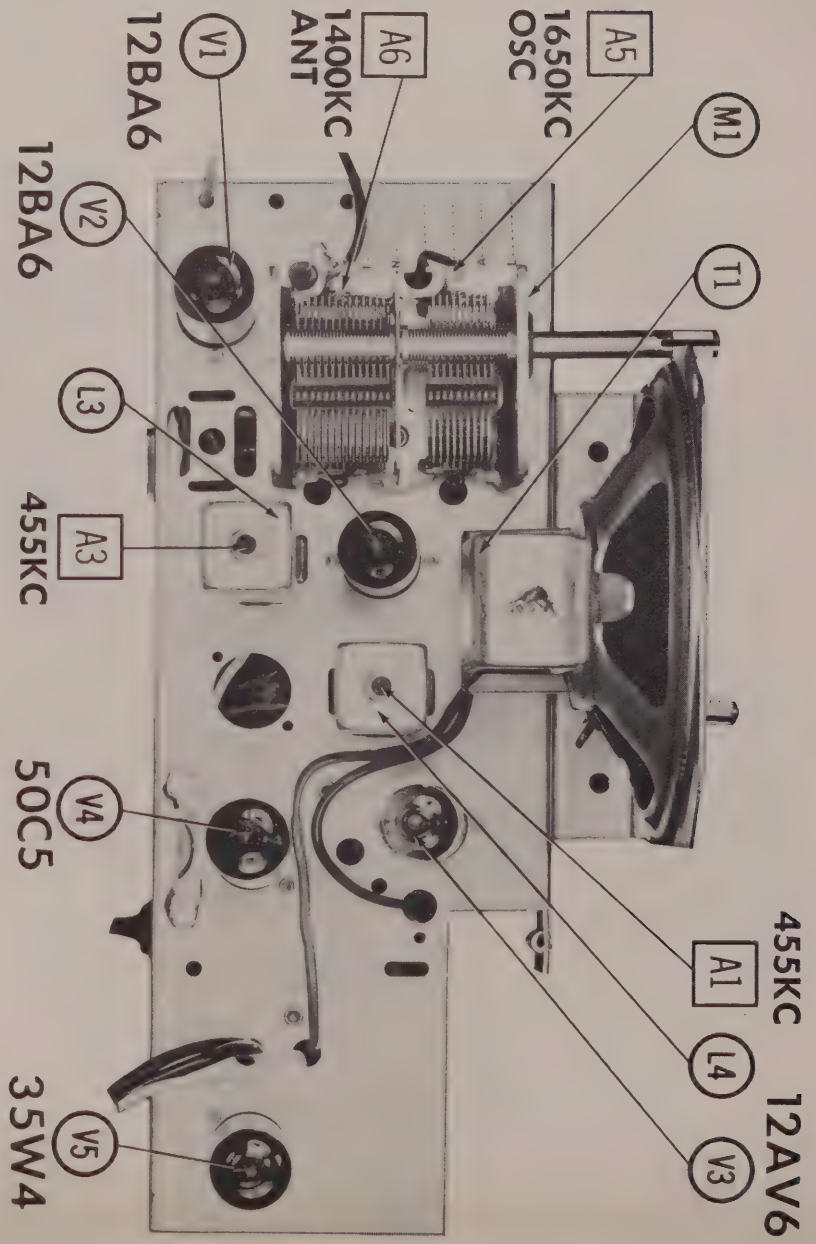
ITEM No.	RATING		DEWALD PART No.	NOTES
	OHMS	WATT		
R2	2.2meg			
R3	220Ω			
R4	2.2meg			

ITEM No.	RATING		DEWALD PART No.	NOTES
	OHMS	WATT		
R5	150Ω			
R6	1500Ω	1		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		DEWALD PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Ant.	L-152					Includes cabinet back
L2	Osc. Coil	O-151					
L3	Input IF	1091C-7	16-6758	BC-352	12-C1	RF-1	
L4	Output IF	1091C-7	16-6758	BC-353	12-C2	RF-2	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	DEWALD PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2300Ω	3-4Ω	Part of SP1	Z1101	A-3025	AU-605	A-3332	24S53	S-12X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	DEWALD PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	703C-5	4A07	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	DEWALD PART No.	REPLACEMENT DATA	
K1	Audio Coup. Net.	5000mmf, 5000mmf, 220mmf, 250mmf, 470K, 470K, 6.8meg	2069-2	Aerovox Centralab Cornell-Dubilier Sprague	PA-113-2 PC-151 116TM2 DT-2

MISCELLANEOUS

ITEM No.	PART NAME	DEWALD PART No.	NOTES
M1	Tuning Cap.	2065-10	2 Gang (Ant. 30-484mmf, Osc. 32-200mmf)
M2	Clock Ass'y.	C-829	Model L-548 only

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

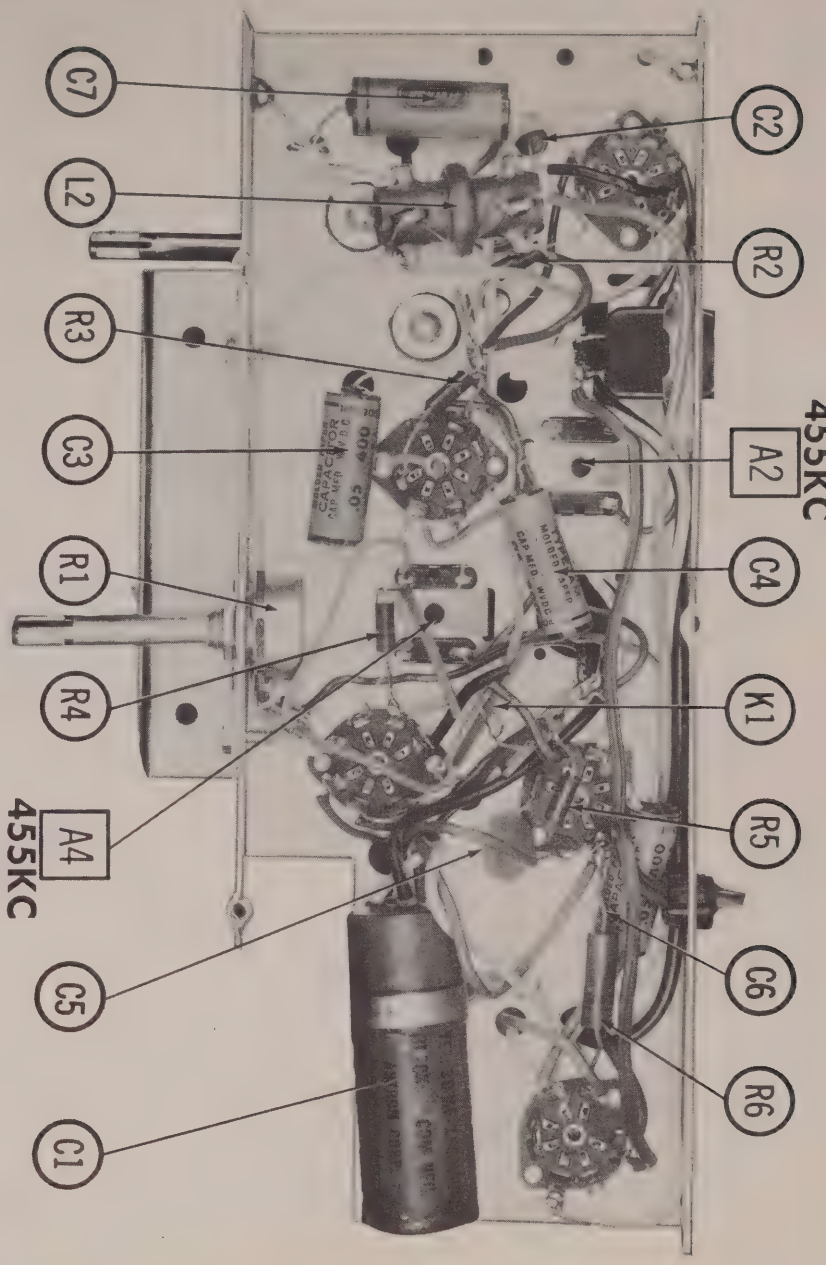
NAME	PART NO.	DESCRIPTION
Knob	K-470	Tuning
Knob	4145-2	Volume
Cabinet	4212-4	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

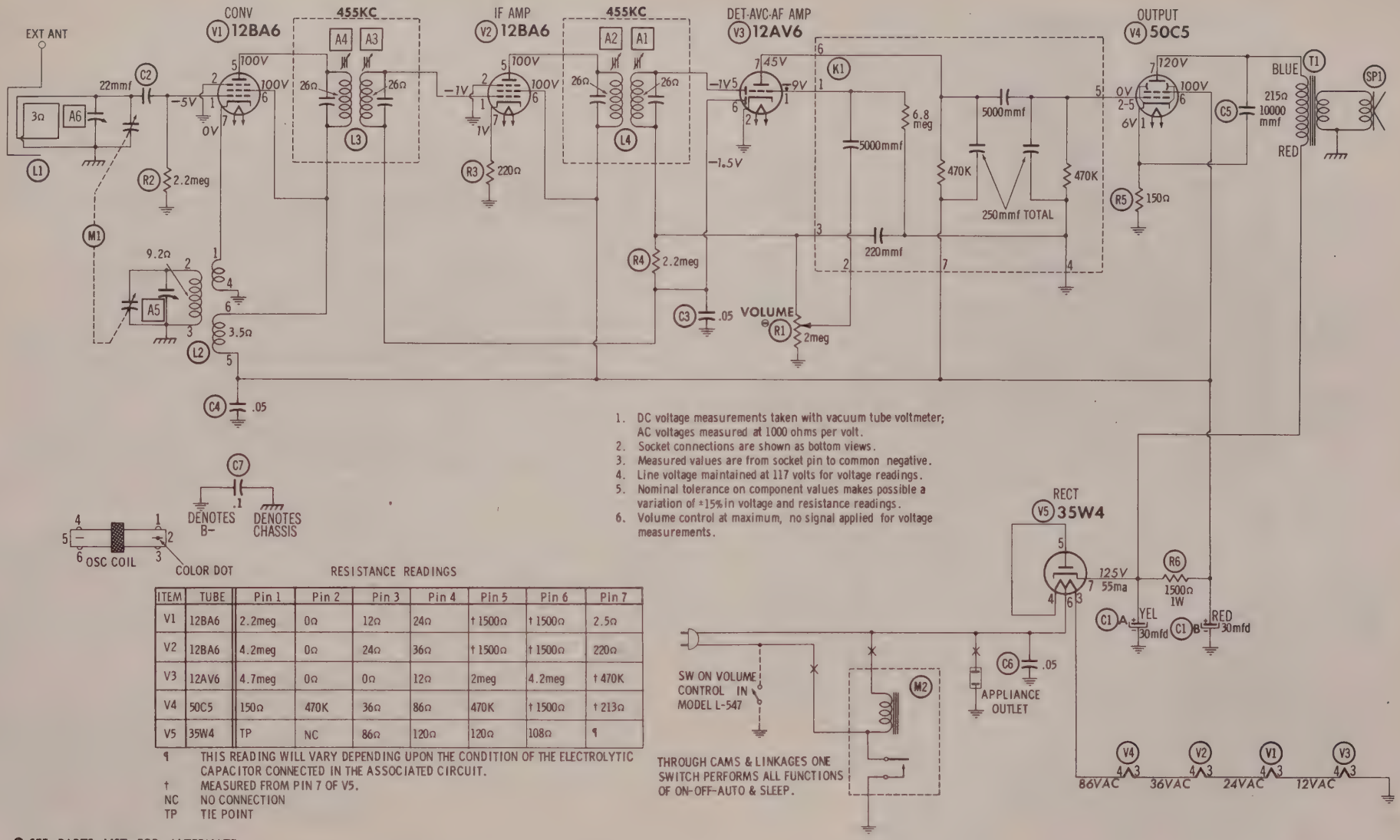
CHASSIS—BOTTOM VIEW



DEWALD MODELS
L-547, L-548

FOLDER 10

DEWALD MODELS
L-547, L-548



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BA6	2.2meg	0Ω	12Ω	24Ω	† 1500Ω	† 1500Ω	2.5Ω
V2	12BA6	4.2meg	0Ω	24Ω	36Ω	† 1500Ω	† 1500Ω	220Ω
V3	12AV6	4.7meg	0Ω	0Ω	12Ω	2meg	4.2meg	† 470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	† 1500Ω	† 213Ω
V5	35W4	TP	NC	86Ω	120Ω	120Ω	108Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION
TP TIE POINT

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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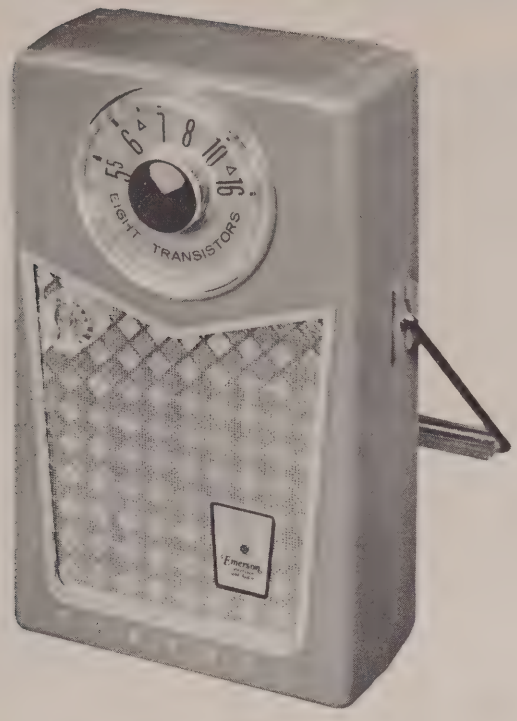
*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

EMERSON MODELS 888, 888R (Ch. 120374)

EMERSON MODELS
888, 888R (Ch. 120374)



EMERSON MODELS
888, 888R (Ch. 120374)

TRADE NAME	Emerson Models 888 Pioneer, 888 Satellite, 888 Vanguard (Ch. 120374); 888R (Remote Speaker)
MANUFACTURER	Emerson Radio & Phono Corp., 14th & Coles Streets, Jersey City 2, N. J.
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	6 Volts DC
TUNING RANGE—BROADCAST	540 - 1650KC
RATING	7.8MA @ 6 Volts DC (No Signal, Min. Volume) 12MA @ 6 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1650KC	"	"	A4	"
3.		"	600KC	600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang. Repeat steps 2 and 3.
4.		"	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

DISASSEMBLY

1. Remove 2 large slotted screws on rear cover. Remove cover.
2. Remove tuning knob screw. Remove tuning and volume knobs.
3. Remove 2 printed board mounting screws.
4. Remove 2 fiber spacers that guide these screws.
5. Remove hex nut holding printed board to cabinet post.
6. Remove chassis from front.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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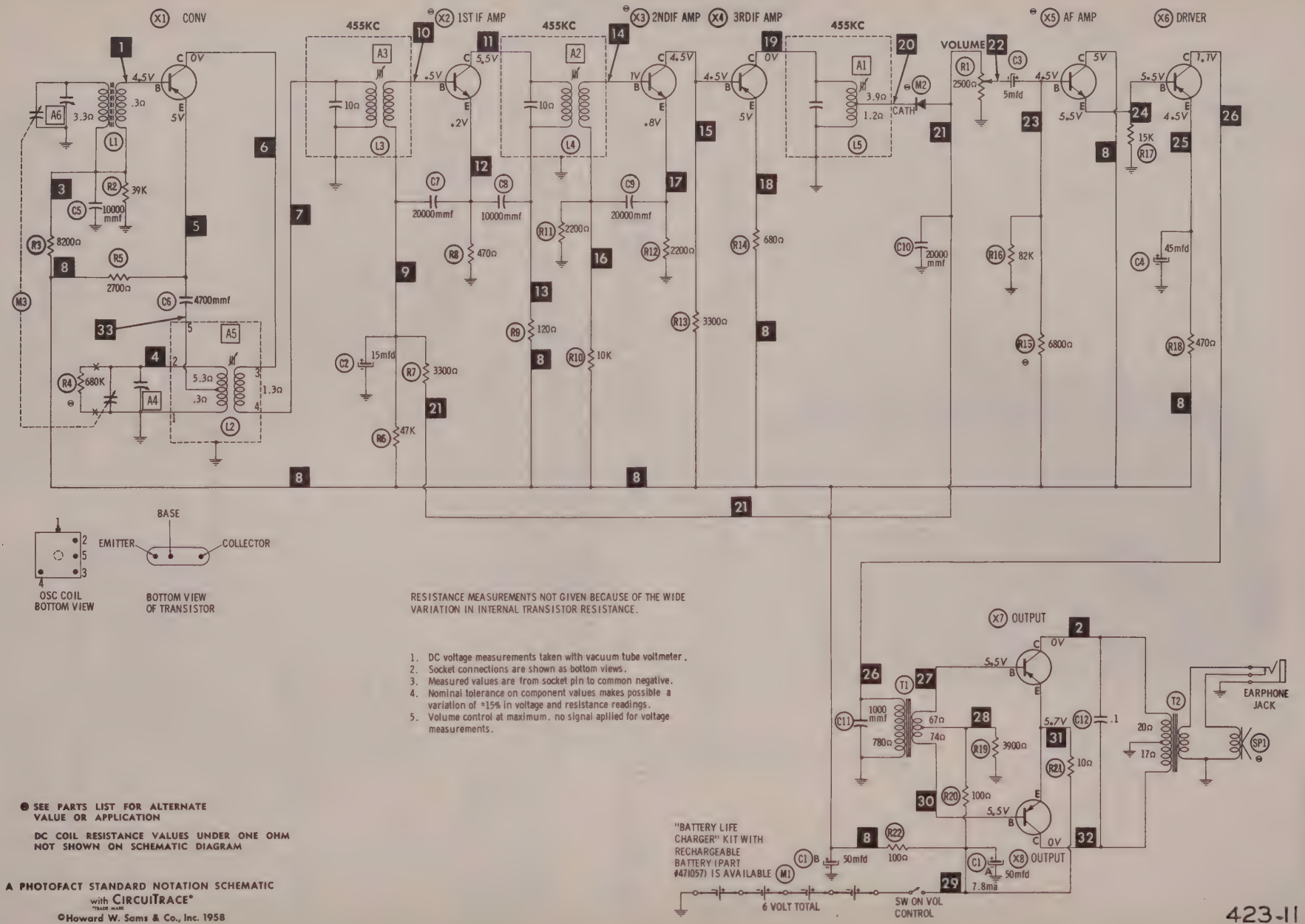
H694

SET 423 FOLDER 11



● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE® ™TRADE MARK

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423-11

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	MFGR. PART NO.	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	815025	Converter			2N485	2N412	PNP
X2		1st IF Amplifier	CBS-2N438			2N233A	NPN ①
X3		2nd IF Amplifier	CBS-2N438			2N233A	NPN ①
X4	815027	3rd IF Amplifier			2N482	2N410	PNP
X5	815028	Af Amplifier	CBS-2N438			2N306	NPN ②
X6	815029	Driver		2N408	2N363	2N406	PNP
X7	815030	Output		2N408	2N633	2N408	PNP
X8	815030	Output		2N408	2N633	2N408	PNP Matched Pair

① Use Part #815026C for X2 and Part #815026A for X3; or Part #815026B for X2 and Part #815026B or Part #815026D for X3.
② Alternate Part #815031.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	EMERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	10	925422						R2520 *
B	50	10							
C2	15	3	925419	PWE3015	NL15-6	TT6X15			TE-1089
C3	5	6	925420	PWE6005	NL5-6	TT6X5	ML5-6		TE-1084
C4	45	10	925421	XPP-10050	NL50-10	TT10X50	ML50-15		R2417 *

* Non-Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	10000		928766	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C6	4700		928767	BPD-0047	DD-472	BYA10D47	UC-5247	5GA-D47	
C7	20000		928138	BPD-02	DD-203	BYB6S2		5HK-S2	
C8	10000		928758	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C9	20000		928138	BPD-02	DD-203	BYB6S2		5HK-S2	
C10	20000		928138	BPD-02	DD-203	BYB6S2		5HK-S2	
C11	1000		928919	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C12	.1	200	920795	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	EMERSON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2500Ω	½	390494			Q13-111		Volume
B	Switch					76-1		

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

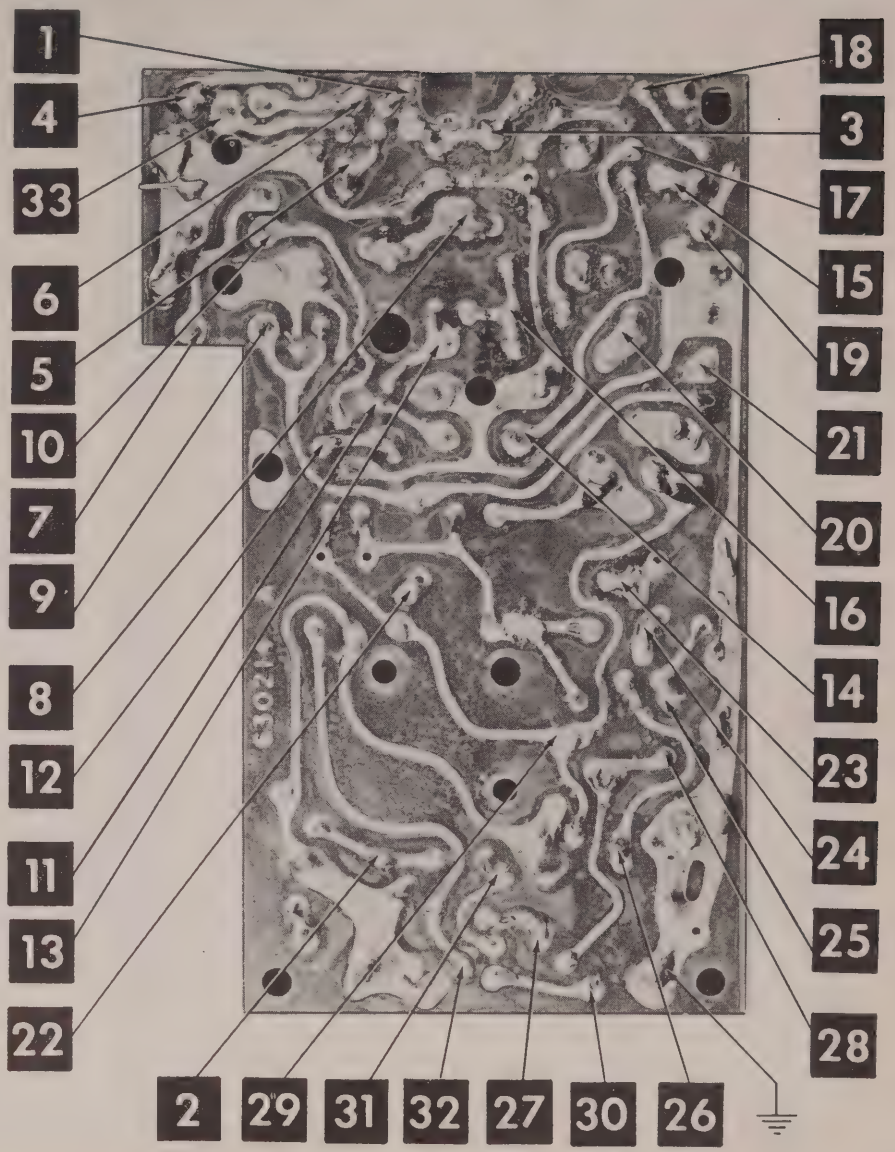
ITEM No.	RATING		EMERSON PART No.	NOTES
	OHMS	WATT		
R2	39K		340872	
R3	8200Ω		340712	
R4	680K		341172	①
R5	2700Ω		340592	
R6	47K		340892	
R7	3300Ω		340612	
R8	470Ω		340412	
R9	120Ω		350272	
R10	10K		340732	
R11	2200Ω		340572	
R12	2200Ω		340572	

ITEM No.	RATING		EMERSON PART No.	NOTES
	OHMS	WATT		
R13	3300Ω		340612	
R14	680Ω		340452	
R15	6800Ω			②
R16	82K		340952	
R17	15K		340772	
R18	470Ω		340412	
R19	3900Ω		340632	
R20	100Ω		340252	
R21	10Ω		340012	
R22	100Ω		350252	

① Not used in some versions.
② Some versions may use 3300Ω (Part #340612) or 8200Ω (Part #340712) in this application.

PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo
*TRADE MARK



EMERSON MODELS
888, 888R (Ch. 120374)

FOLDER 11

EMERSON MODELS
888, 888R (Ch. 120374)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		EMERSON PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Stick	700132	14-9005				
L2	Osc. Coil	716118					
L3	1st IF	720302					
L4	2nd IF	720302					
L5	3rd IF	720303					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	EMERSON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.2	: 1	734157					T-51X ①	① Use original channel frame.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	EMERSON PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	240Ω CT	3-4Ω	734156						TY-57X①	① Use original channel frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	EMERSON PART No.	QUAM PART No.	
SP1	3½" 6" x 9"	PM	3-4Ω	180175 180187 ①		① Remote speaker, Model 888R

BATTERIES

ITEM No.	VOLTAGE	EMERSON PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	6V	①		Z ②		915 ②		M-15R ②	② Four used

① "Battery Life Charger" kit with rechargeable battery (Part #471057) is available.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		EMERSON PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N295 *	817069	1N64	1N295	Detector (Pigtail)

* Some versions may use 1N60 in this application.

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M3	Tuning Cap.	900172	2 Gang, Ant. 10-136mmf, Osc. 15-95mmf
	Printed Board	630214A	Less components
	Printed Board	630225	Less components (Alternate)

CABINETS & CABINET PARTS

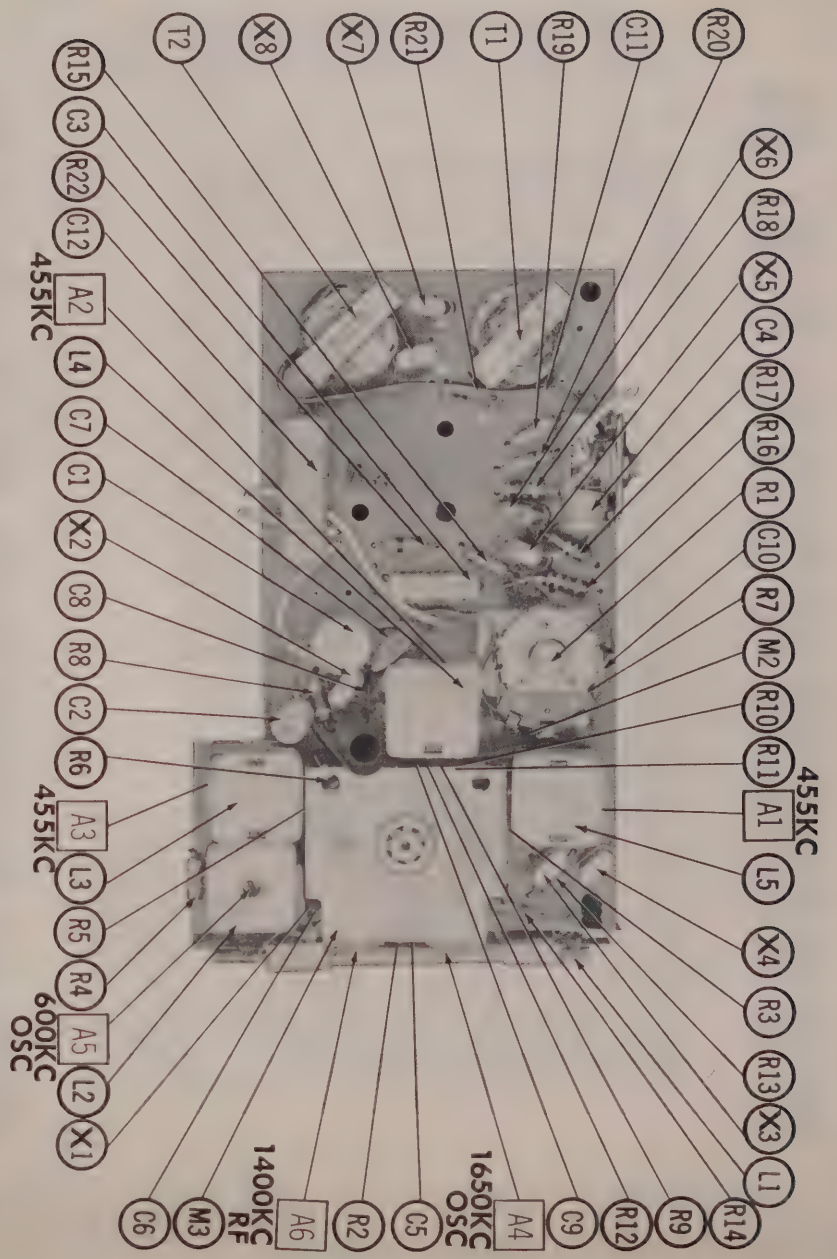
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	460916	Tuning (Pioneer, Satellite)
Knob	461006	Tuning (Vanguard)
Knob	460917	On-Off-Volume (Pioneer)
Knob	461001	On-Off-Volume (Satellite)
Knob	461000	On-Off-Volume (Vanguard)
Knob	413245	On-Off-Volume Disc (Vanguard)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT* Folder

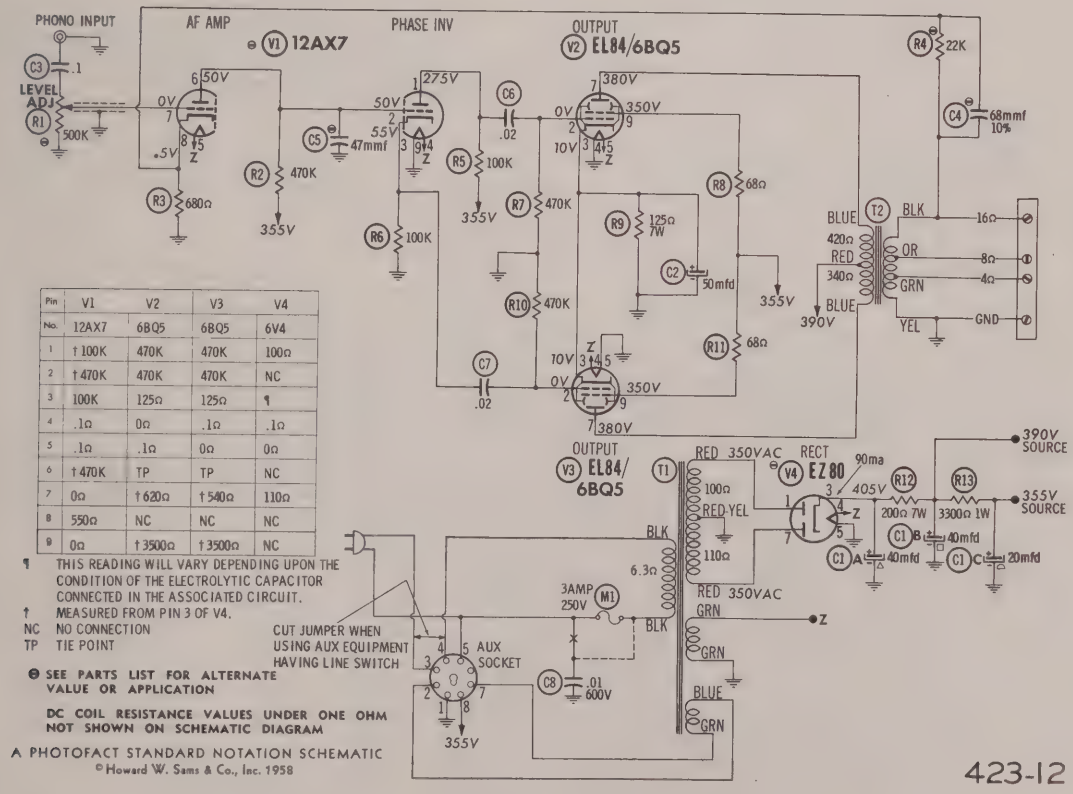
*TRADE MARK

EIA ELECTRONIC INDUSTRIES ASSOCIATION MEMBER

FISHER MODEL 20-A

FISHER MODEL 20-A

TRADE NAME	Fisher Model 20-A
MANUFACTURER	Fisher Radio Corp., 21-21 44th. Drive, Long Island City, 1, N.Y.
TYPE SET	AC Operated Audio Amplifier
TUBES (Four)	Types 12AX7/ECC83 AF Amp.-Phase Inv., (2) EL84/6BQ5 Output, EZ80/6V4 Rectifier
POWER SUPPLY	105-125 Volts AC-50/60 Cycles RATING .695 Amp. @ 117 Volts AC (68 Watts)



Pin No.	V1 12AX7	V2 6BQ5	V3 6BQ5	V4 6V4
1	†100K	470K	470K	100Ω
2	†470K	470K	470K	NC
3	100K	125Ω	125Ω	¶
4	.1Ω	0Ω	.1Ω	.1Ω
5	.1Ω	.1Ω	0Ω	0Ω
6	†470K	TP	TP	NC
7	0Ω	†620Ω	†540Ω	110Ω
8	550Ω	NC	NC	NC
9	0Ω	†3500Ω	†3500Ω	NC

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 3 OF V4.
NC NO CONNECTION
TP TIE POINT

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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423-12

FISHER MODEL 20-A

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	AF Amp. -Phase Inv.	12AX7/ ECC83
V2	Output	EL84 /6BQ5
V3	Output	EL84/6BQ5
V4	Rectifier	EZ80/6V4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	FISHER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	450	P-563-127 ①	AFH3-43-50	C0344	FP376.9	TMT-39	T-165 MT-4510	TVL-3786
B	■40	450							
C	▬20	450							
C2	50	25	C-556-128	PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206

① Alternate Part #C-563-127.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	FISHER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	.1	200	C68P104M2	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C4	68		CC21GP680K5	NPO-SI 68	D6-680	L10Q68		MS-468	10% ①
C5	47		CC21GP470K5	NPO-SI 47	D6-470	L10Q47		MS-447	②
C6	.02	400	C68P203M4	P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C7	.02	400	C68P203M4	P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C8	.01	600	C-2747	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	

①Some versions may use 24mmf 10% in this application (Part #CC21GP240K5).
②Some versions may use 68mmf 10% in this application (Part #CC21GP680K5).

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	FISHER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500K	½	R-582-117	JP-504				Level Adjust ①

① Part #R-520-139 may be used in some versions.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

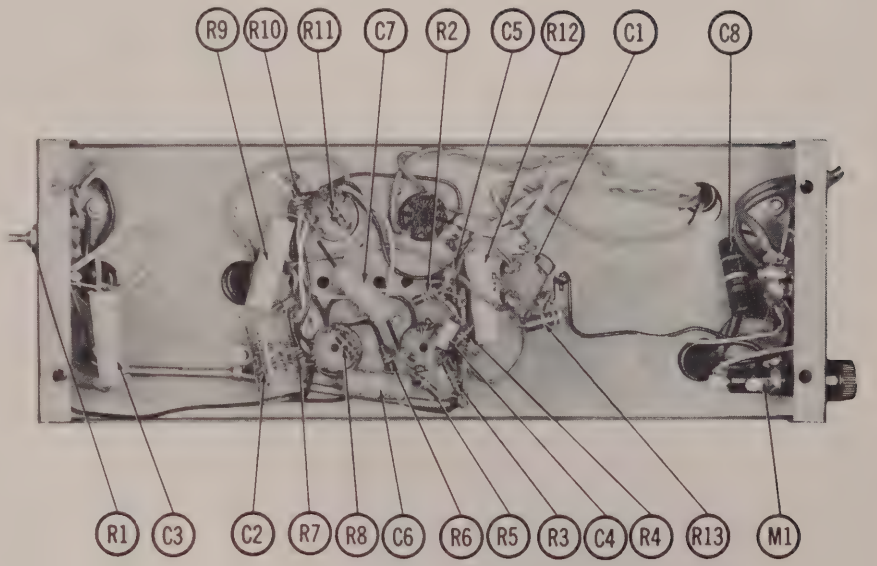
ITEM No.	RATING OHMS	RATING WATT	FISHER PART No.	NOTES
R2	470K		RC20BF474K	
R3	680Ω		RC20BF681K	
R4	22K		RC20BF223K	Note 1
R5	100K		RC20BF104K	
R6	100K		RC20BF104K	
R7	470K		RC20BF474K	
R8	68Ω		RC20BF680K	
R9	125Ω	7(WW)	R-556-124	
R10	470K		RC20BF474K	
R11	68Ω		RC20BF680K	
R12	200Ω	7(WW)	R-539-120	
R13	3300Ω	1	RC30BF332K	

Note 1. Some versions may use 15K in this application (Part #RC20BF153K).

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RATING SEC. 4	RATING SEC. 5	FISHER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @.695A	700VCT @.090A	6.3V @2.3A	6.3V @1A			T-582-12						

CHASSIS—BOTTOM VIEW



TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	FISHER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	10K CT	16Ω tap @ 8Ω, 4Ω	T-582-113	Z1405 ①	A-3132 ①		A-3311 ①	22S93 ①		① Drill new mounting holes.

FUSES

ITEM No.	TYPE	RATING	FISHER PART No. FUSE	FISHER PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	3A 250V	F-3000		312003. (3AG 3A 250V)	342001	AGC 3	HKP

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT* Folder with CIRCUITRACE*

GENERAL ELECTRIC MODELS P745A, P746A

GENERAL ELECTRIC MODELS P745A, P746A

GENERAL ELECTRIC MODELS P745A, P746A

TRADE NAME	General Electric Models P745A, P746A
MANUFACTURER	General Electric Co., Products Service, Radio Receiver Dept., 869 Broad St., Utica, N.Y.
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	4.5 Volts DC
TUNING RANGE—BROADCAST	540-1600KC
RATING	18MA @ 4.5 Volts DC (No Signal, Min. Volume) 30MA @ 4.5 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400∿ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1620KC	"	"	A4	"
3.		"	1400KC	Tune to 1400KC signal	"	A5	"
4.		"	600KC	600KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang. Repeat steps 2, 3 and 4.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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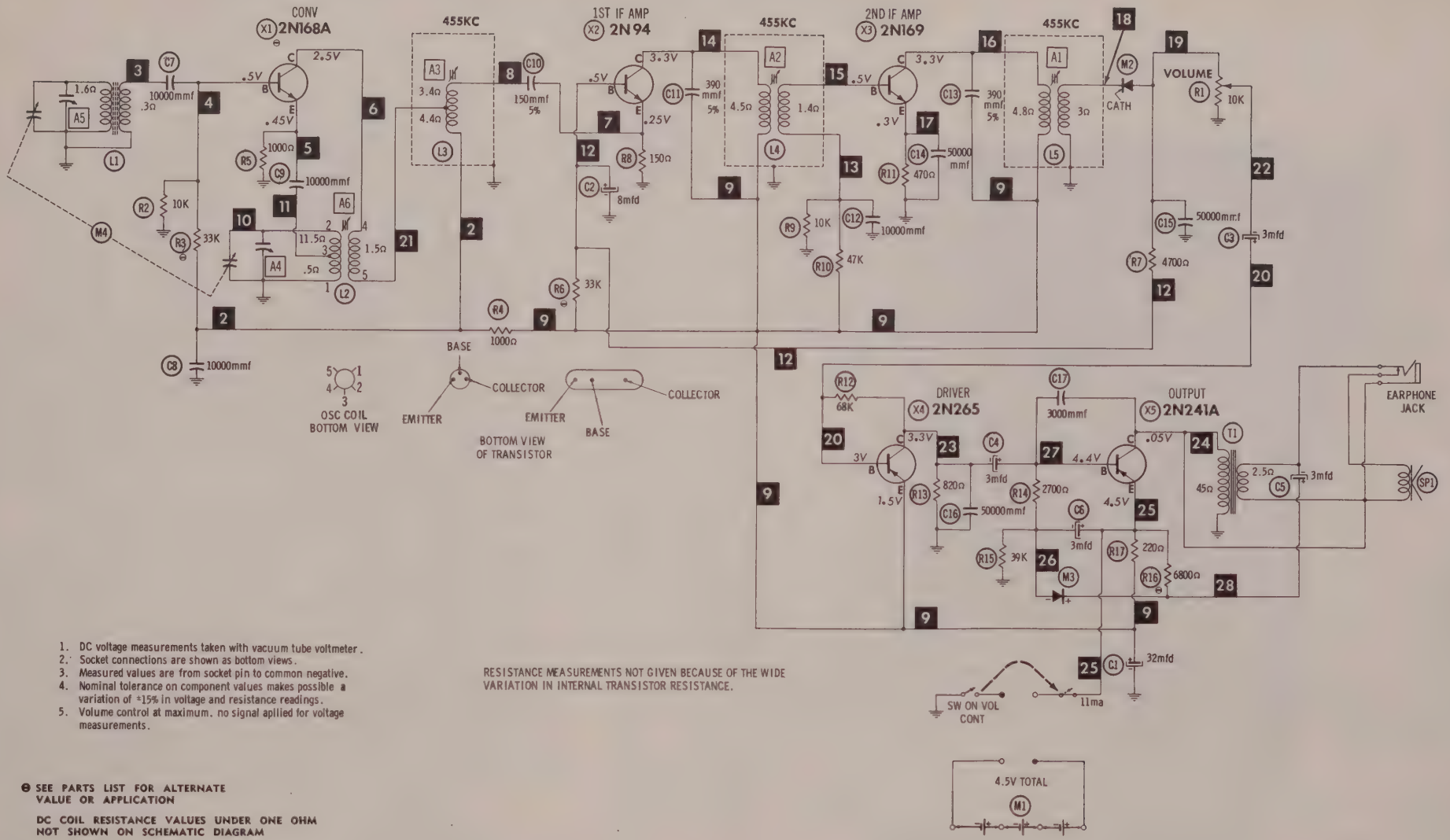
SET 423 FOLDER 13



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal apllied for voltage measurements.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE*

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PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N168A	Converter	CBS-2N439			2N168A	NPN Note 1
X2	2N94	1st IF Amplifier	CBS-2N438			2N94	NPN
X3	2N169	2nd IF Amplifier	CBS-2N438			2N169A	NPN
X4	2N265	Driver			2N362	2N406	PNP
X5	2N241A	Output			2N631	2N241A	PNP

Note 1. Alternate type 2N164A.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	32	6	RS-1463	PWE6030	NL30-6	TT6X40	ML30-6	MQ-0130	TE-1092
C2	8	6	RS-1462	PWE6008	NL8-6	TT6X8	ML8-6		TE-1086
C3	3	6	RS-1460	PWE6003	NL3-6	TT6X2	ML4-6		TE-1082
C4	3	6	RS-1460	PWE6003	NL3-6	TT6X2	ML4-6		TE-1082
C5	3	6	RS-1460	PWE6003	NL3-6	TT6X2	ML4-6		TE-1082
C6	3	6	RS-1460	PWE6003	NL3-6	TT6X2	ML4-6		TE-1082

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	G. E. PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C7	10000		RS-1022	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C8	10000		RS-1022	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C9	10000		RS-1022	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C10	150			1469-00015	DTZ-150	22R5T15	MCE236	MS-315	5%
C11	390			1469-00039		5R5T39		MS-339	5%
C12	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C13	390			1469-00039		5R5T39		MS-339	5%
C14	50000		RS-1024	BPD-05	DF-503			5HK-S5	
C15	50000		RS-1024	BPD-05	DF-503			5HK-S5	
C16	50000		RS-1024	BPD-05	DF-503			5HK-S5	
C17	3000			BPD-003	DD-302	BYA10D3	UC-523	5HK-D3	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	G.E. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	10K	½	RS-1379		44S-10K-W			Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

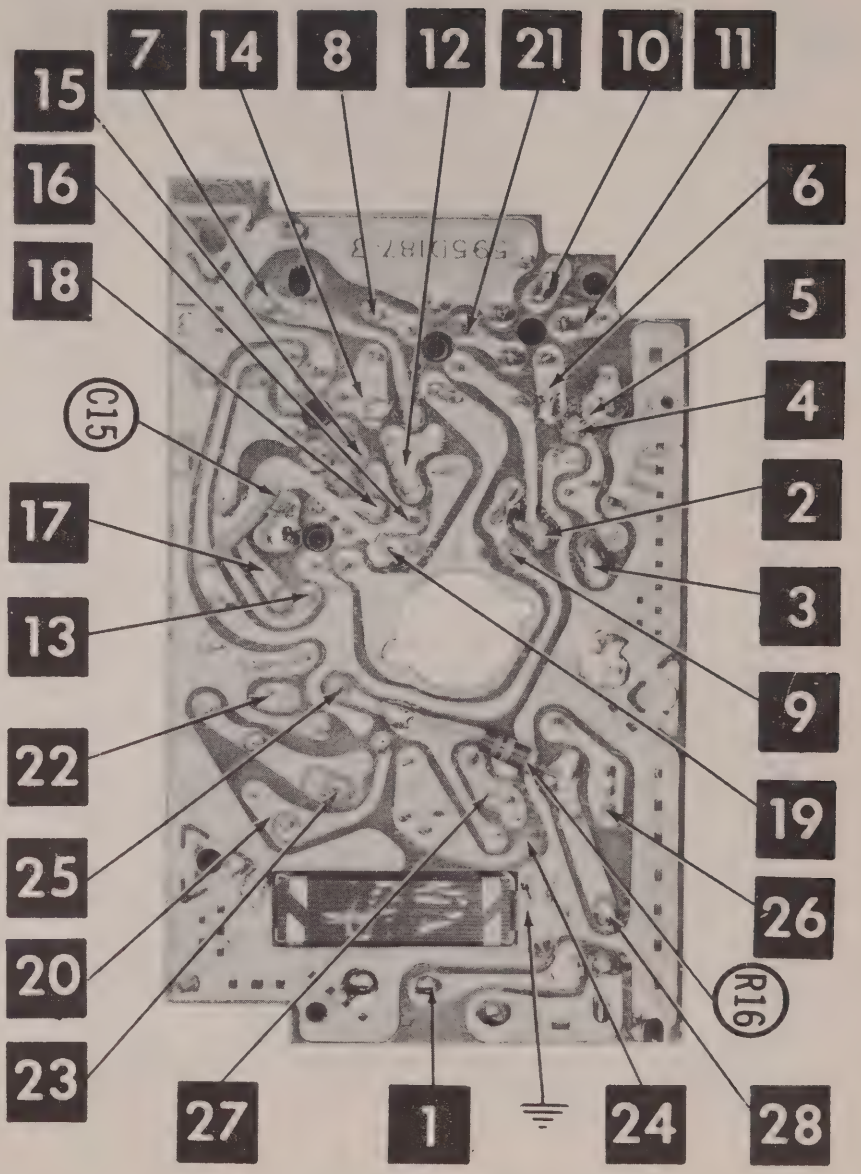
ITEM No.	RATING		G. E. PART No.	NOTES
	OHMS	WATT		
R2	10K			
R3	33K			Note 1
R4	1000Ω			
R5	1000Ω			
R6	33K			Note 2
R7	4700Ω			
R8	150Ω			
R9	10K			

ITEM No.	RATING		G. E. PART No.	NOTES
	OHMS	WATT		
R10	47K			
R11	470Ω			
R12	68K			
R13	820Ω			
R14	2700Ω			
R15	39K			
R16	6800Ω			Note 3
R17	220Ω			

Note 1. Some versions may use 39K in this application.
Note 2. Value may vary between 33K and 39K. Replace with original value unless X2 has been replaced. If X2 has been replaced, choose value of R6 to obtain proper voltage across R8.
Note 3. Value may vary between 1000Ω and 10K. Replace with original value.

PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo
*TRADE MARK



GENERAL ELECTRIC MODELS
P745A, P746A
FOLDER 13

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		G. E. PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Stick	RS-1380					
L2	Osc . Coil	RS-1373					
L3	1st IF	RS-1374					
L4	2nd IF	RS-1375					
L5	3rd IF	RS-1376					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	G. E. PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	70Ω	17Ω	RS-1372							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	G. E. PART No.	QUAM PART No.	
SP1	2 3/4"	PM	17Ω	RS-1377		

BATTERIES

ITEM No.	VOLTAGE	G. E. PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	4.5V			Z ①		915 ① E9 ①②		M-15R① ZM9①②	① 3 Used. ② Mercury Type.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		G. E. PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N87G		1N60	1N295	Detector (Pigtail)
M3	1N87G		1N60	1N295	Audio Bias Rectifier (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	G. E. PART No.	NOTES
M4	Tuning Cap. Printed Board	RS-1378 595D187-3	2 Gang (Ant. 9-137mmf, Osc. 17-92mmf)

CABINETS & CABINET PARTS

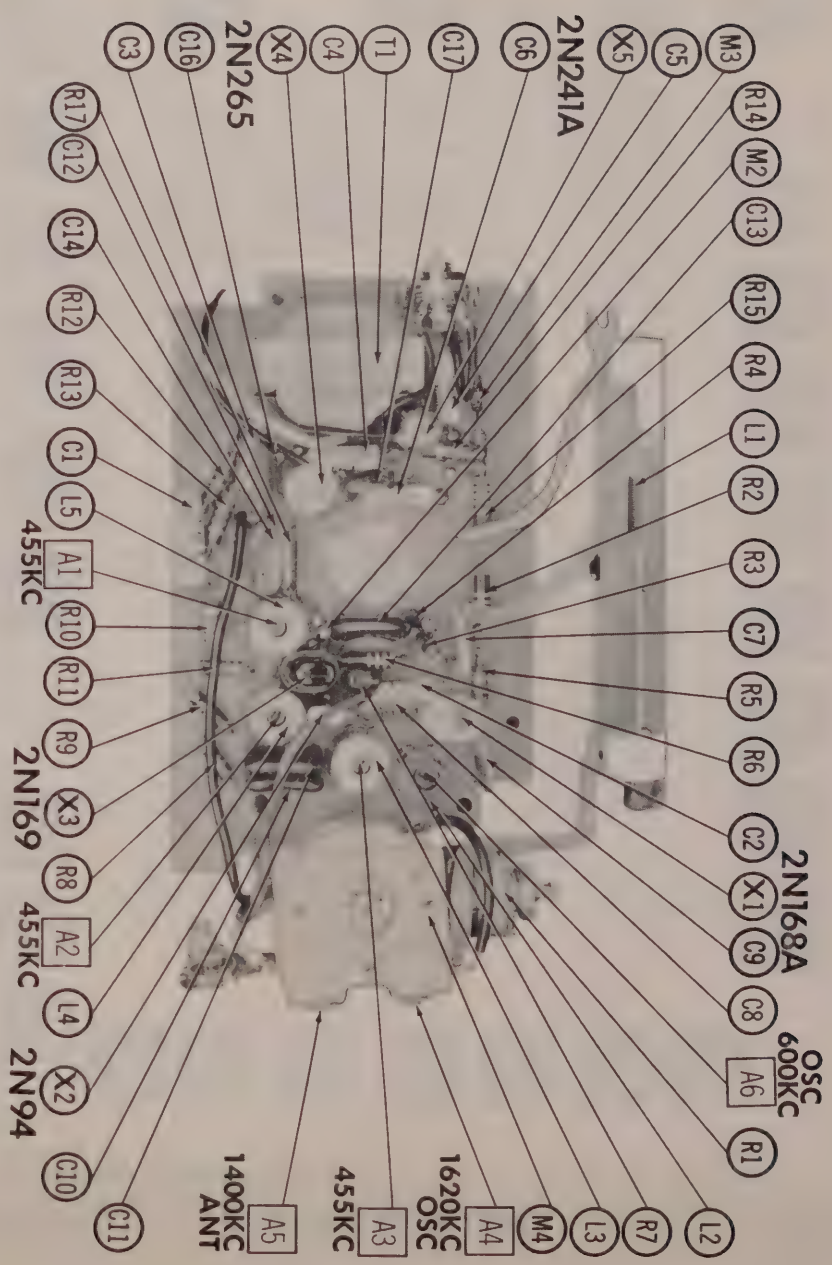
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	RS-1362	Tuning
Knob	RS-1398	On-Off-Volume, Model P746A
Knob	RS-1366	On-Off-Volume, Model P745A
Cabinet	RB-1062	Complete, Model P746A
Cabinet	RB-1058	Complete, Model P745A

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

McINTOSH MODELS
C-4 (Revised), C-4P (Revised), D-8A

McINTOSH MODELS
C-4 (Revised), C-4P (Revised), D-8A

McINTOSH MODELS
C-4 (Revised), C-4P (Revised), D-8A

TRADE NAME	Mc Intosh Models C-4, C-4P (Includes D-8A) Revised (Serial #6600 and Higher)
MANUFACTURER	Mc Intosh Laboratory, Inc., 2 Chambers Street, Binghamton, N.Y.
TYPE SET	AC Operated 5 Channel Audio Amplifier
TUBES (Three)	Types 12AX7 Phono-Mic Preamplifier , 12AX7 Cathode Follower, 12AX7 AF Amp.-Cathode Follower
POWER SUPPLY	110-120 Volts AC-60 Cycle (Model C-4 is Externally Powered) RATING .13 Amp. @ 117 Volts AC (13 Watt)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H712

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Phono-Mic Préamp.	12AX7	
V2	Cathode Follower	12AX7	

ITEM No.	USE	TYPE	NOTES
V3	AF Amp.-Cathode Follower	12AX7	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MC INTOSH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	8	450		PRS450V88	BBRD8D45	TCD71	TDLD-24	MTD-4508	TVA-2720
B	8	450							
C2	2000	15		PRSI5V2000	BR20001				R2425 *
C3	2000	15		PRSI5V2000	BR20001				R2425 *
C4A	▲20	450		AFH3-36				Q-027	R2317 *
B	■30	300						MT-2530	
C	▲30	250							
C5	50	6		SRE6V50	BBR50-6	TT6X50	TD-50-6	MMT-650	TVA-1100

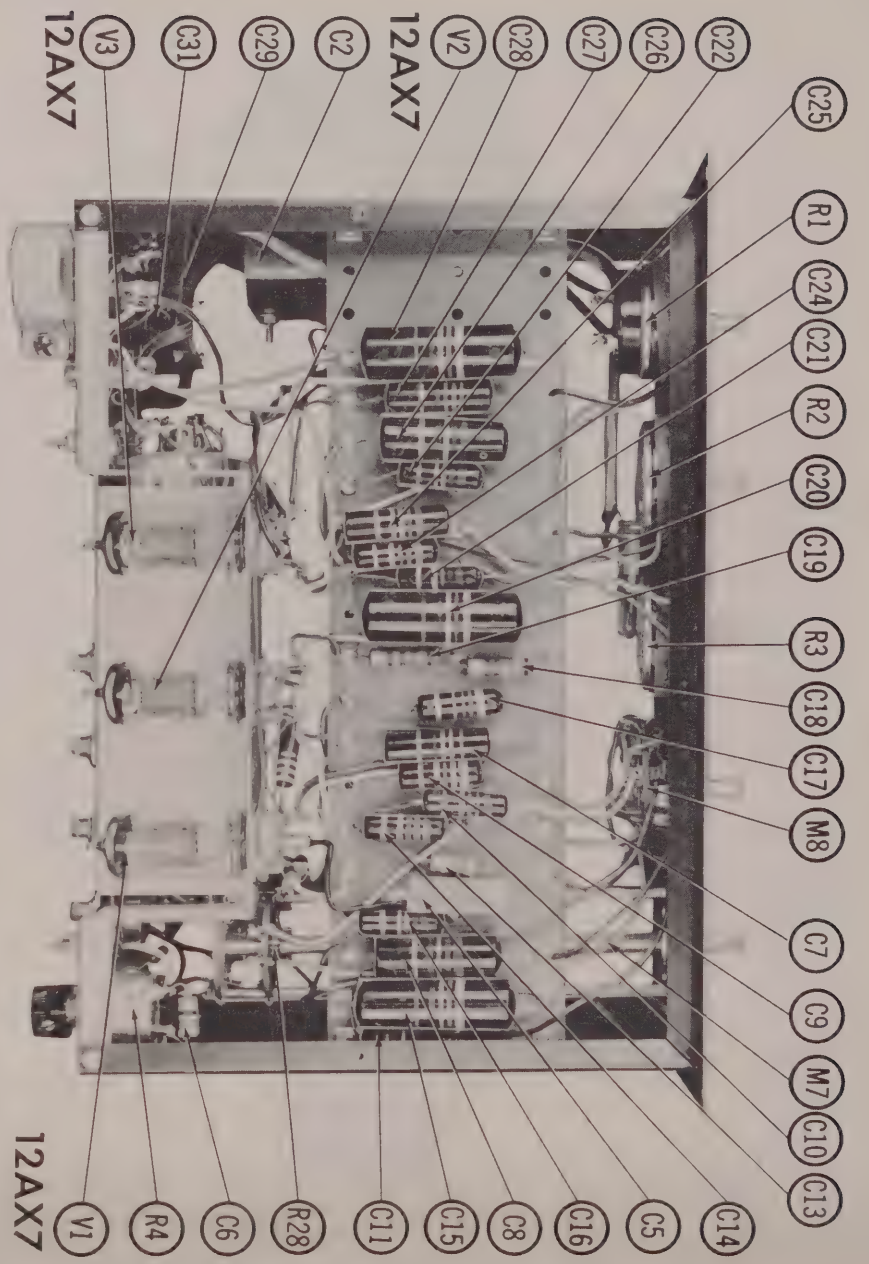
* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	MC INTOSH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	100			SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C7	.033	400		P488N-033	DF-303	CUB6S33	GEM-4133	6TM-S33	
C8	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C9	.0033	400					GEM-16233		10%
C10	.0018	400							10%
C11	.001	400		P488N-001	D6-102	CUB6D1	GEM-421	6TM-D1	
C12	.001	400		P488N-001	D6-102	CUB6D1	GEM-421	6TM-D1	
C13	470			SI 470	D6-471	LT6T47	UC-5347	5GA-T47	
C14	.0022	400							10%
C15	.47	400		P488N-47		CUB4P47	GEM-4047	4TM-P47	
C16	.001	400					GEM-1621		10%
C17	.0047	400					GEM-16247		10%
C18	1500			SI 1500	D6-152	LT6D15	UC-5215	5GA-D15	
C19	1500			SI 1500	D6-152	LT6D15	UC-5215	5GA-D15	
C20	.47	400		P488N-47		CUB4P47	GEM-4047	4TM-P47	
C21	.001	400					GEM-1621		10%
C22	.01	400		P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C23	100			SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C24	.0022	400							10%
C25	.022	400					GEM-4122		10%
C26	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C27	.033	400		P488N-033	DF-303	CUB6S33	GEM-4133	6TM-S33	
C28	.47	200		P288N-47		CUB2P47	GEM-2047	2TM-P47	
C29A	10000			BPD-2X01	DD-103	BYD6DS1	DC511	5HK-2S1	
B	10000				DD-103		DC511		
C30	4700			BPD-0047	DD-472	BYA10D47	UC-5247	5HK-D47	
C31A	10000			BPD-2X01	DD-103	BYD6DS1	DC511	5HK-2S1	
B	10000				DD-103		DC511		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MC INTOSH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	1	2015125		A47-1meg-Z	Q13-137	U53	Volume
B	Shaft				KSS-3	Not Req.	Not Req.	
C	Switch				SWE-20	76-2	US-27	AC Power
R2A	250K	1	1-010-2144		A47-250K-Z	Q13-130	U44	Treble
B	Shaft				KSS-3	Not Req.	Not Req.	
R3A	1meg	1	1-010-2145		A47-1meg-Z	Q13-137	U53	Bass
B	Shaft				KSS-3	Not Req.	Not Req.	
R4A	100K	½	DA1132	AB-40	A47-100K-S	Q11-128	U41	Phono 2 Load
B	Shaft			AK-9	RS-2	PQ	Not Req.	
C	Switch			KR-2 or KB-2*	SWE-20	76-2	US-27	Constant Amplitude Cartridge
R5A	100K	½	DA1131	AB-41	A47-100K-Z	Q13-128	U39	Level Phono 2
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R6A	100K	½	DA1131	AB-41	A47-100K-Z	Q13-128	U39	Level Phono 1
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R7A	100K	½	DA1131	AB-41	A47-100K-Z	Q13-128	U39	Level Mic
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R8A	500K	½	DL3458	AB-60	A47-500K-Z	Q13-133	U48	Level Tuner
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R9A	500K	½	DL3458	AB-60	A47-500K-Z	Q13-133	U48	Level Tape
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R10A	250Ω	½	BB2859	AB-2		Q11-201	U2	Hum Adj.
B	Shaft			AK-1		RQ	Not Req.	

* Use KR with CRL "red label" controls and KB with "blue label" controls.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MC INTOSH PART No.	NOTES
	OHMS	WATT		
R11	6800Ω			
R12	1200Ω			Note 1
R13	1meg			Note 2
R14	220K 5%			
R15	100K			Note 3
R16	3300Ω	1		
R17	750Ω 5%	1		
R18	1meg			
R19	1800Ω			
R20	330K			
R21	330K	1		
R22	100K			
R23	10meg			
R24	560K			
R25	3.3meg			
R26	10meg			
R27	10meg			
R28	22meg			
R29	560K			
R30	100K			
R31	330K			

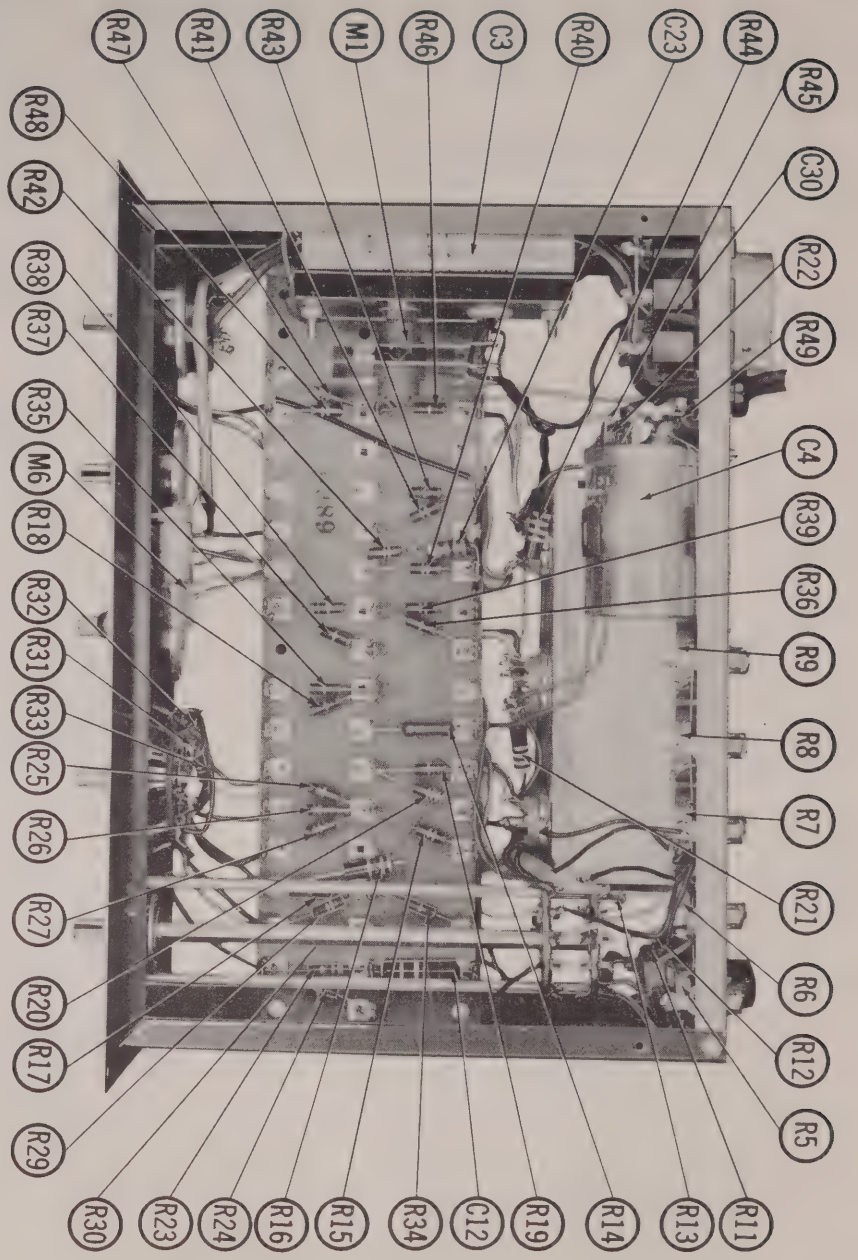
ITEM No.	RATING		MC INTOSH PART No.	NOTES
	OHMS	WATT		
R32	180K			
R33	100K			
R34	10meg			
R35	1.2meg			
R36	1meg			Note 4
R37	1.2meg			
R38	1800Ω			
R39	100K			
R40	100K			
R41	10K			
R42	220K			
R43	1200Ω			
R44	330K	1		
R45	100K			
R46	1meg			
R47	1800Ω			
R48	100K			
R49	12K	1		
R50	560K	1		
R51	10K			

Note 1. Some versions may use 1000Ω in this application.
Note 2. Some versions may use 100K in this application.
Note 3. Some versions may use 1meg in this application.
Note 4. Some versions may use 1.2 meg in this application.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MC INTOSH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @.13A	400V @.004A	6.3V @1.3A	M186						

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	MC INTOSH PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.42A		1017	C1B	HN26-1D1-ZS	
M2	.004A		1159	D-5410	10	
M3	.004A		1159	D-5410	10	
M4	.004A		1159	D-5410	10	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MC INTOSH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M5	AGC	1/2A 250V			312.500 (3AG $\frac{1}{2}$A 250V)	342001	AGC 1/2	HKP

MISCELLANEOUS

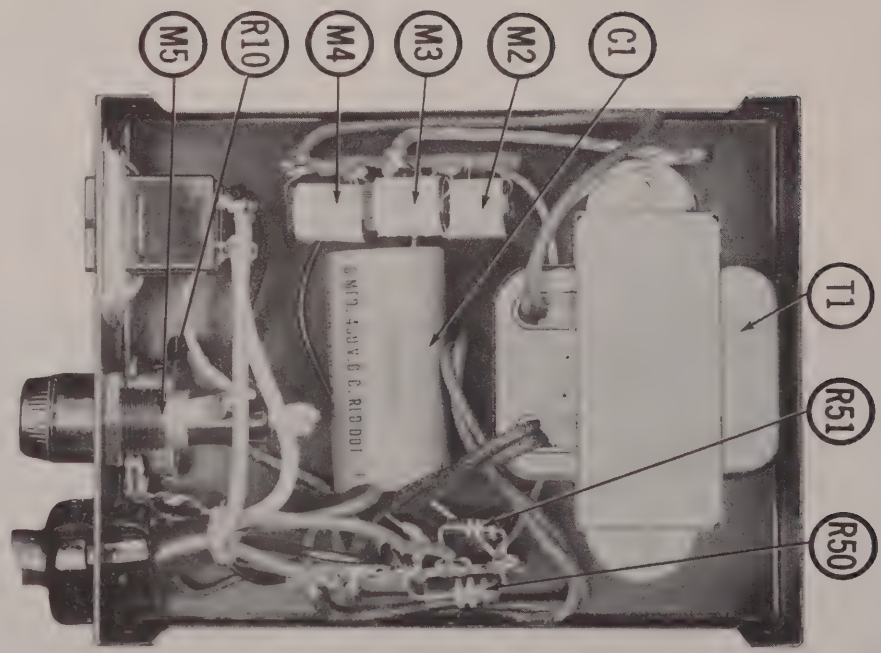
ITEM No.	PART NAME	MC INTOSH PART No.	NOTES
M6	Lamp		#1847
M7	Switch		Input Selector, Rotary, Wafer Type
M8	Switch		Compensation, Rotary, Wafer Type

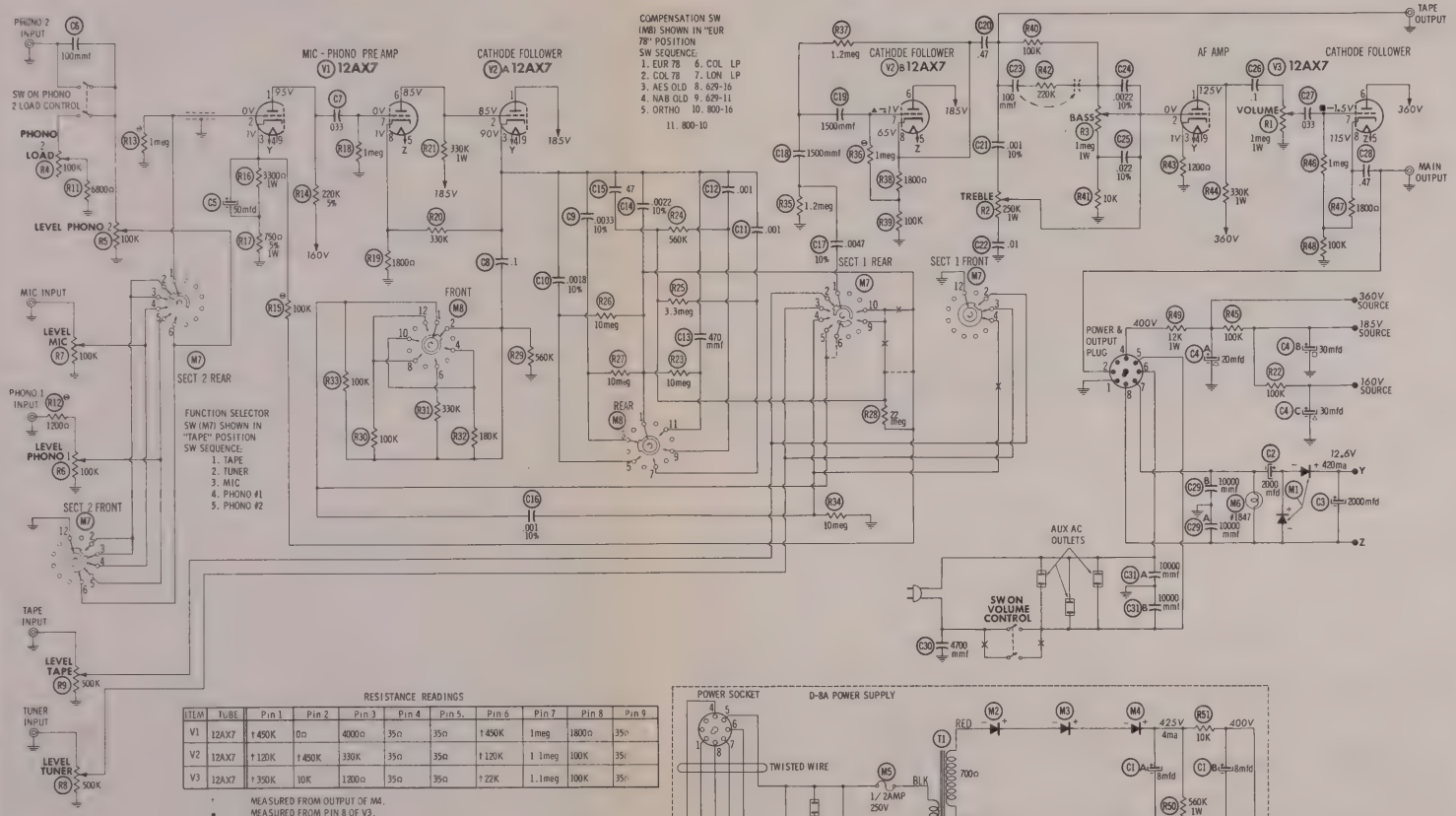
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K ($7\frac{1}{2}$ Ft. Length)

POWER CHASSIS—BOTTOM VIEW

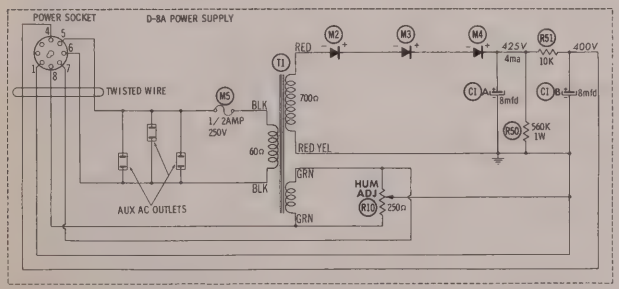




RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	↑450K	0Ω	4000Ω	35Ω	35Ω	↑450K	1meg	1800Ω	35Ω
V2	12AX7	↑120K	↑450K	330K	35Ω	35Ω	↑120K	1.1meg	100K	35Ω
V3	12AX7	↑330K	10K	1200Ω	35Ω	35Ω	↑22K	1.1meg	100K	35Ω

* MEASURED FROM OUTPUT OF M4.
■ MEASURED FROM PIN 8 OF V3.
▲ MEASURED FROM PIN 8 OF V2



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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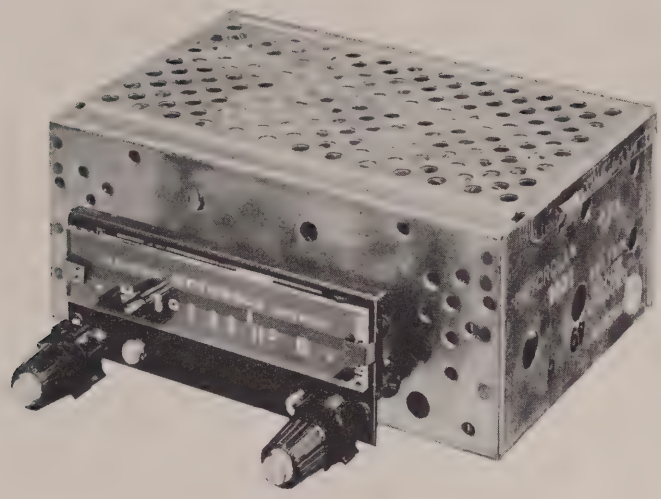
MOTOROLA MODEL 8MX

MOTOROLA MODEL 8MX



TRADE NAME	Motorola Model 8MX
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	Battery Operated Universal Type AM Automobile Receiver
TUBES (Five)	Types 12BL6 RF Amplifier, 12AD6 Converter, 12BL6 IF Amplifier, 12F8 Det.-AVC-AF Amplifier, 12K5 Driver
POWER SUPPLY	12 Volt Storage Battery — RATING 1.4 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	535 - 1605KC

MOTOROLA MODEL 8MX

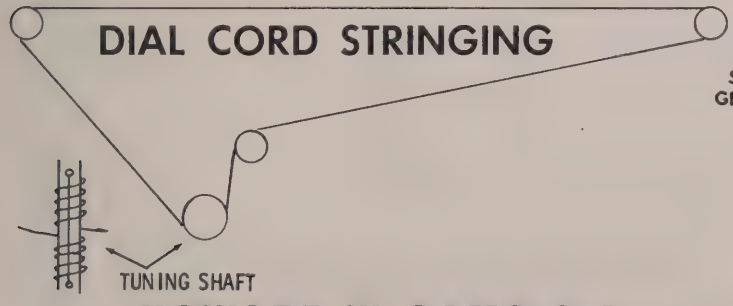
ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at high frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 12AD6 (V2). Low side to chassis.	262.5KC (400∿ Mod.)	High frequency end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	Fig. 1	Thru dummy to antenna receptacle.	1610KC	"	"	A5, A6, A7	"
	The following steps are not necessary unless tuner has been tampered with or associated components have been replaced. If necessary, remove dial scale mounting assembly and back tuning cores (A8, A9, A10) out of coils but not out of coil forms. Alignment tool #66A76278 may be used. Repeat step 2.						
3.	Fig. 1	Thru dummy to antenna receptacle.	1200KC	Carriage 9/32" from high end stop.	Across voice coil	A8, A9, A10	Adjust for maximum output.
4.	"	"	1610KC	High frequency end stop	"	A5, A6, A7	Adjust for maximum output. Repeat steps 3 & 4. Cement cores in place.
5.	With radio installed in car and antenna fully extended, tune in a weak station near 1400KC and adjust A7 for maximum output.						

DIAL CORD STRINGING



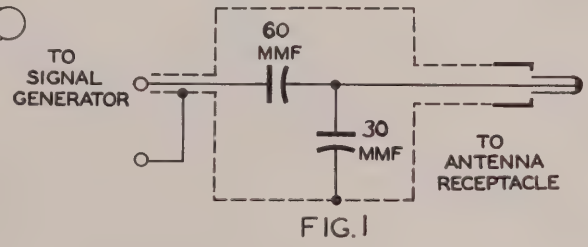


FIG. 1

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H659

SET 423 FOLDER 15

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BL6	
V2	Converter	12AD6	
V3	IF Amplifier	12BL6	

ITEM No.	USE	TYPE	NOTES
V4	Det. - AVC - AF Amplifier	12F8	
V5	Driver	12K5	

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N176	Output	CBS-2N155	2N176		2N176	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■500	16	23B560487	AFH3-00-90		WP300.51			R2664 *
B	▲100	16							
C	100	16							

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

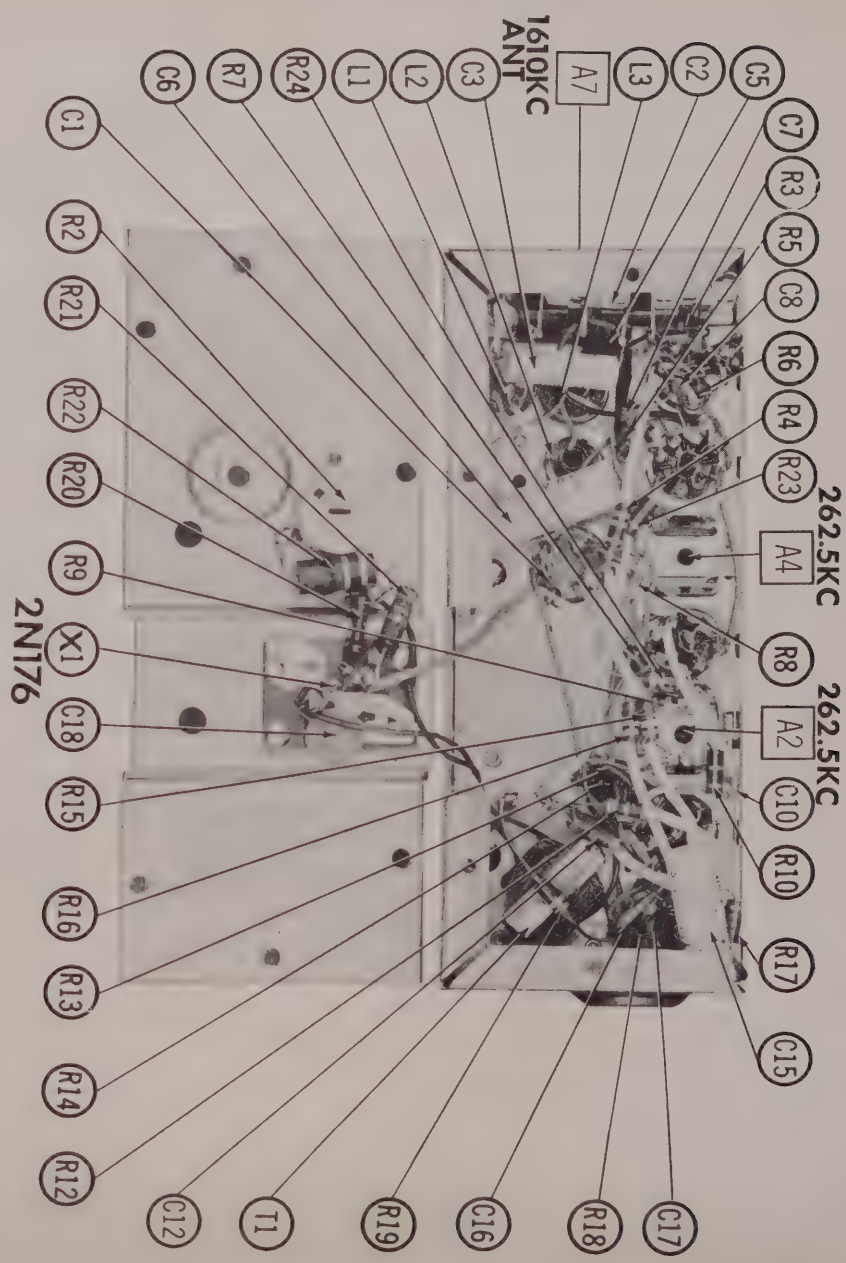
ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	40-430		20A542758						
C3	.003	600	8R121569	P688N-003	D6-302	CUB6D3	GEM-623	6TM-D3	
C4	20-120		20K541014						
C5	47		21R114207	N750-DI 47	DTN-47	C10Q47U		5TCU-Q47	N750
C6	.05	200	8R121005	P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C7	220		21K121698	BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	
C8	47		21R115593	N750-DI 47	DTN-47	C10Q47U		5TCU-Q47	N750
C9	395-470		20A485708						
C10	27		21R410089						NPO 10%
C11	10000		21R482726	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C12	10000		21R482726	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C13	.01	200	8R121868	P288N-01	D6-103	CUB2S1	GEM-411	2TM-S1	
C14	.002	600	8R121568	P688N-002	D6-202	CUB6D2	GEM-622	6TM-D2	
C15	.05	200	8R121005	P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C16	10000		21R482726	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C17	330		21R410118	BPD-00033	DD-331	L10T33	UC-5333	5GA-T33	
C18	25000		21K740806					TG-S25	
C19	.5	100	8K122076	P288N-5		CUB2P5	GEM-205	2TM-P5	
C20			64K530177						
C21			64K530177						

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	18K542446	F1-42	RTV-664C	QJ-1084A		Tone
B	2meg	½		R2-72	Not Req.	Not Req.	■ UE38378	Volume, Tap ③ 1meg
C	Switch			KB-1 or KR-1*	Not Req.	Not Req.		
R2	125Ω	2(WW)	18K542493		39-125		FL-150	Transistor Bias

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.
■ "STA-LOC" Equivalent: FA55A, OS1875, RU26T16, IS2500, US41

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	MOTOROLA PART No.	NOTES
R3	22meg		6R11847	
R4	3300Ω		6K121725	
R5	22meg		6R118247	
R6	47K		6K121687	
R7	330Ω		6K127940	
R8	91meg		6K538716	
R9	22K		6K119405	
R10	5.6meg		6R3988	
R11	100K		6K122313	
R12	4.7meg		6K121277	
R13	3.3meg		6K119407	
R14	6.8meg		6K121933	
R15	270K		6R6414	
R16	120K		6K127540	
R17	270Ω		6K121303	
R18	27Ω		6B119401	
R19	3.3meg		6K119407	
R20	10Ω Cold		6K540634	
R21	5.6Ω	(WW)	17K739323	
R22	47Ω	2	6R127673	
R23	220Ω		6R6270	
R24	470Ω		6K127633	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA MOTOROLA PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Ant. Coupling Coil	24B560429					Part of M3.
L2	Ant. Coil	24B560432					Part of M3.
L3	Osc. Coil	24B560425					Part of M3.
L4	Input IF	24K542491	16-6752	BC-350	12-H1	RF-3	
L5	Output IF	24K542749	16-6754	BC-354	12-H6		
	Output IF	24K542675	16-6754	BC-354	12-H6		Alternate
L6	"A" Lead Choke	24A472535					

FILTER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L7	.6A ②	.58Ω	.012 Hy.	25B536760						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO PRI.	SEC.	REPLACEMENT DATA MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	6.5	: 1	25K542760						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	REPLACEMENT DATA MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	23Ω Tap ② 3-4Ω	25C542489							

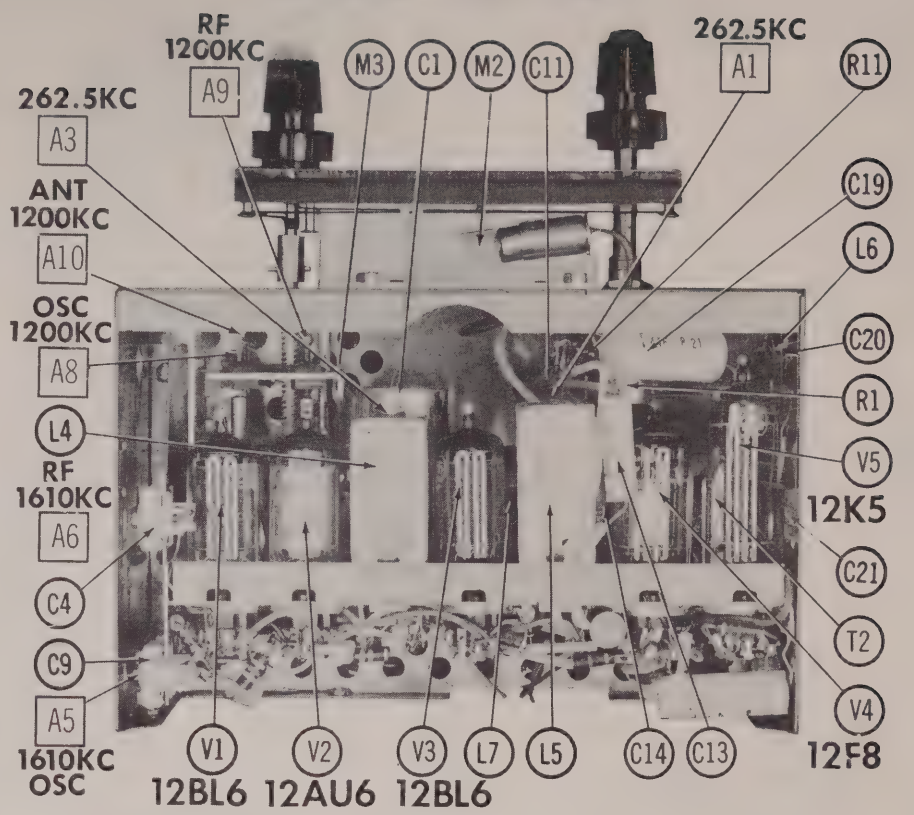
SPEAKER

ITEM No.	TYPE SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA MOTOROLA PART No.	QUAM PART No.	NOTES
SP1	6" x 9"	PM	3-4Ω	50C541101	69A2	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA MOTOROLA PART No. FUSE	MOTOROLA PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	SFE	9A 32V	65K16248	1V541705	307009. (9A 32V)	155009	SFE9	HDH

CHASSIS—TOP VIEW



MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M2	Lamp	65R533821	#1891
M3	Tuner	77D560423	(MT-238) Complete

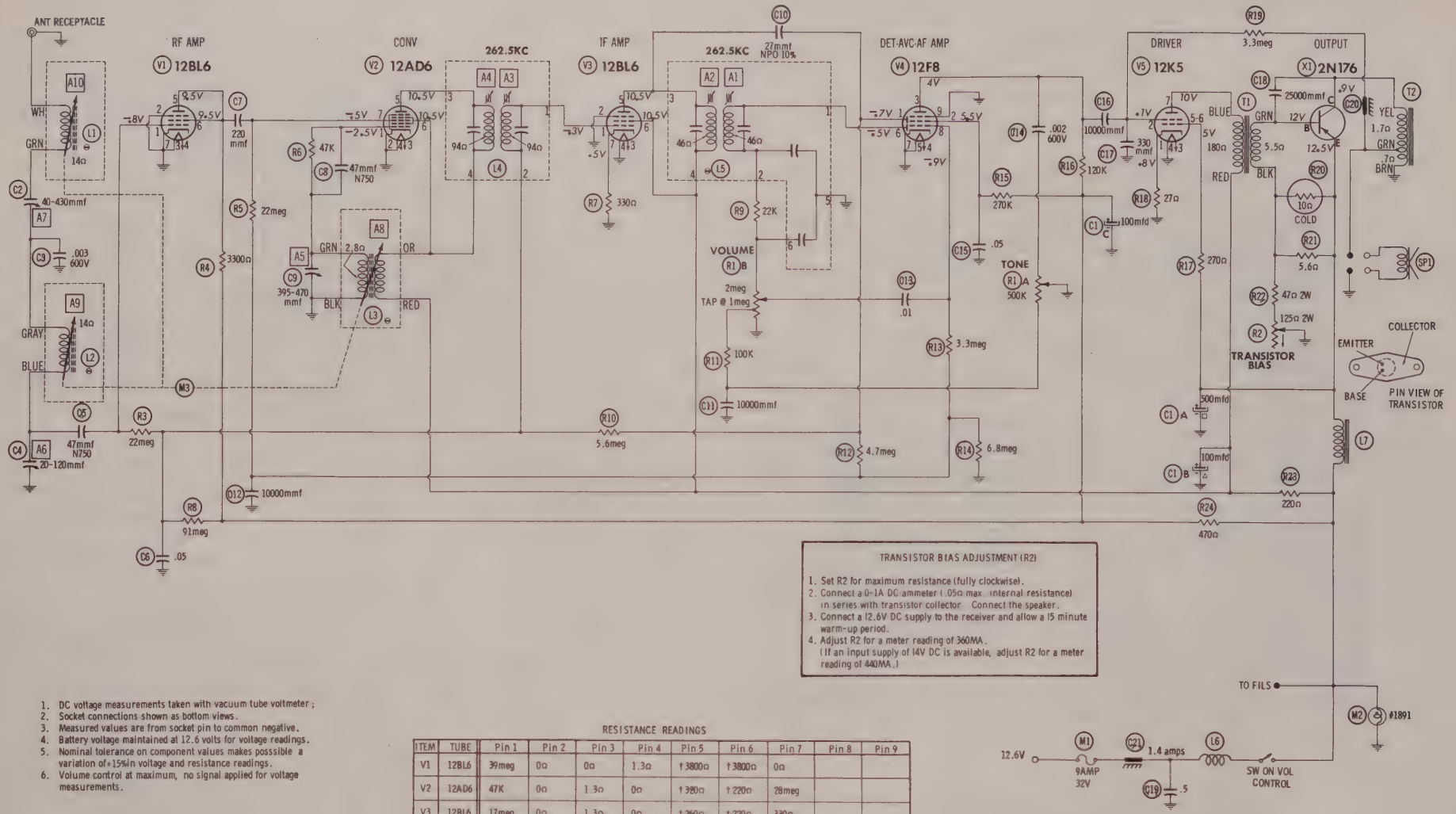
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	36B540048	On-Off Volume, Tuning
Knob	36B540050	Tone
Knob	36K540051	Dummy
Top Cover	15C542733	
Dial Pointer	1K532594	
Dial Scale	34B541017	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661



TRANSISTOR BIAS ADJUSTMENT (R2)

1. Set R2 for maximum resistance (fully clockwise).
2. Connect a 0-1A DC ammeter (.05Ω max. internal resistance) in series with transistor collector. Connect the speaker.
3. Connect a 12.6V DC supply to the receiver and allow a 15 minute warm-up period.
4. Adjust R2 for a meter reading of 360MA.
   (If an input supply of 14V DC is available, adjust R2 for a meter reading of 440MA.)

1. DC voltage measurements taken with vacuum tube voltmeter;
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes posssible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BL6	39meg	0Ω	0Ω	1.3Ω	†3800Ω	†3800Ω	0Ω		
V2	12AD6	47K	0Ω	1.3Ω	0Ω	†320Ω	†220Ω	28meg		
V3	12BL6	17meg	0Ω	1.3Ω	0Ω	†260Ω	†220Ω	330Ω		
V4	12F8	11meg	†270K	†120K	1.3Ω	0Ω	800K	0Ω	10meg	0Ω
V5	12K5	27Ω	3.3meg	1.3Ω	0Ω	†270Ω	†270Ω	†400Ω		

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
† MEASURED FROM JUNCTION OF L7 AND R24.

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EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PACEMAKER MODEL 2215

PACEMAKER MODEL 2215

PACEMAKER MODEL 2215

TRADE NAME	Pacemaker Model 2215
MANUFACTURER	Bell Sound Systems Inc., 555 Marion Road, Columbus 7, Ohio
TYPE SET	AC Operated 6 Channel 10 Watt Audio Amplifier
TUBES (Five)	Types ECC83/12AX7 Phono Preamplifier, 6CQ8 AF Amp.-Phase Inv., (2) 6V6GT Output, EZ80/6V4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING .63 Amp. @ 117 Volts AC (58 Watts)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H708

SET 423 FOLDER 16

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Phono Preamp.	ECC83/ 12AX7 ①	
V2	AF Amp.-Phase Inv.	6CQ8	
V3	Output	6V6GT	
V4	Output	6V6GT	
V5	Rectifier	EZ80/6V4	①

① Equivalent type listed may not be directly interchangeable.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Bell Sound PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	400		PR4-185	BBRQ22245C	TCT3114		Q-250	R2704 *
B	20	400							
C	25	25							
C2A	10	350		PRS450V1010	BBRT11145	TCD62	TDLD-26	MTD-4510	TVA-2722
B	10	350							
C3	20	6		PWE6020	NL20-6	TT6X25	ML20-6		TE-1090

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Bell Sound PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	330			BPD-00033	DD-331	L10T33	UC-5333	5GA-T33	
C5	1000					1R5D1	MCB255	MS-21	10%
C6	180				D6-181	22R5T18		MS-318	10%
C7	470				D6-471	5R5T47		MS-347	10%
C8	3000					1R5D3	MCB461	MS-23	10%
C9	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C10	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C11	4000					1R5D4	MCB463	MS-24	10%
C12	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C13	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C14	240				D6-241	L10T24		MS-324	10%
C15	3000					1R5D3	MCB461	MS-23	10%
C16	3000					1R5D3	MCB461	MS-23	10%
C17	27				TCZ-27	C10Q27C			NPO 10%
C18	470				D6-471	5R5T47		MS-347	10%
C19	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C20	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C21	.05	400		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	NPO 10%
C22	68			NPO-DI 68	DTN-68	C10Q68C		5TCC-Q68	NPO 10%①

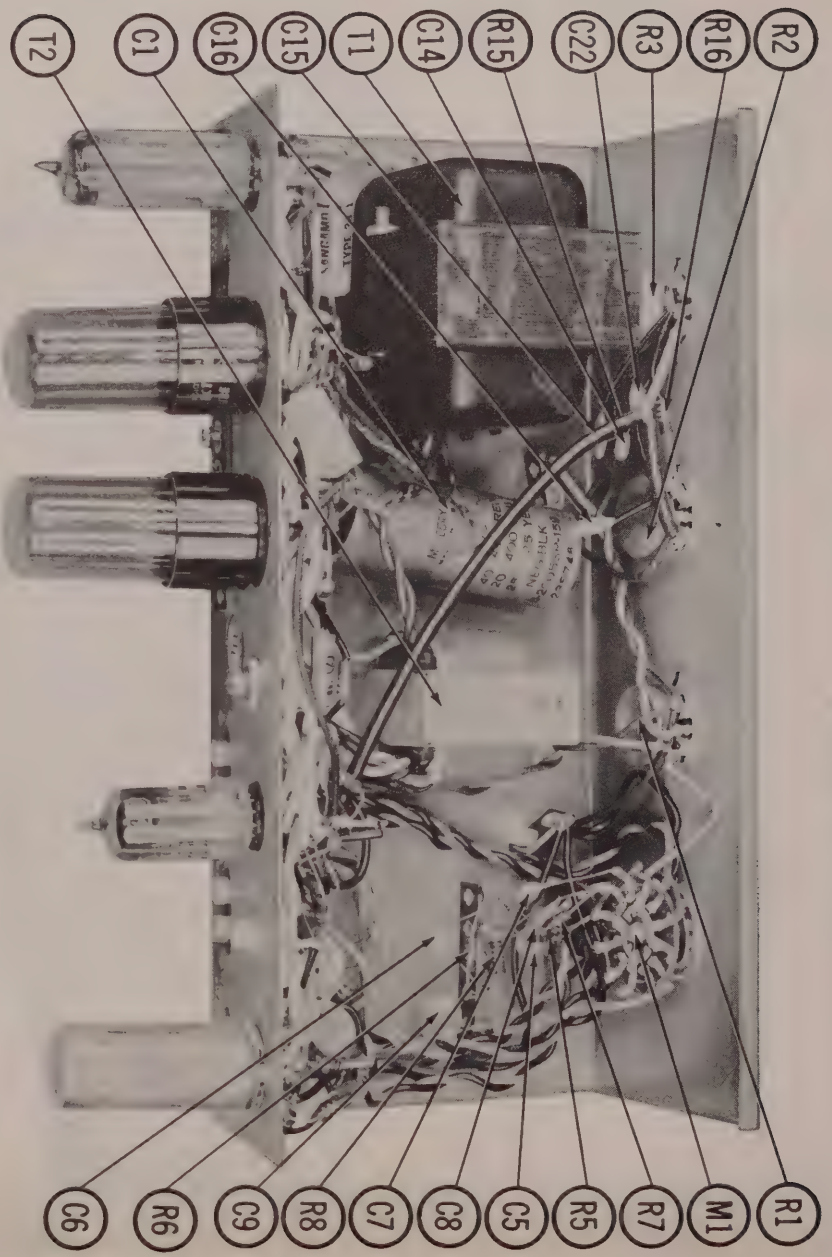
① Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Bell Sound PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	B20066-P152	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2A	2meg	½	B20066-P151	B-76	A47-2meg-Z	Q13-139	U55	Bass
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	2meg	½	B20066-P150	B-76	A47-2meg-Z	Q13-139	U55	Treble
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	
R4A	100Ω	2(WW)	B20066-P141	WN-101	A43-100	WPK100	R100L	Hum Balance
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	

* Use KR with CRL "red label" controls and KB with "blue label" controls.

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Bell Sound PART No.	NOTES
R5	3.3meg			
R6	270K			
R7	1meg			
R8	270K			
R9	470K			
R10	56K			
R11	680Ω			
R12	4.7meg			
R13	4.7meg			
R14	470K			
R15	330K			
R16	68K			
R17	100K			

ITEM No.	RATING OHMS	RATING WATT	Bell Sound PART No.	NOTES
R18	2.2meg			
R19	22K			
R20	270K			
R21	13K 5%			
R22	47Ω			
R23	10K			
R24	270K			
R25	270K			
R26	10K			
R27	470K			
R28	470K			
R29	250Ω	5(WW)		
R30	2200Ω	1		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA Bell Sound PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @.62A	640VCT @.080A	6.3V @2.1A	B-20326 ①						

① Part #B-20334 used with 50∿ power line.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Bell Sound PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	8400Ω CT	16Ω Tap @ 8Ω,4Ω	B-20344	Z1404	A-2904	AU-600	A-3852	26S46	S-55Z	

MISCELLANEOUS

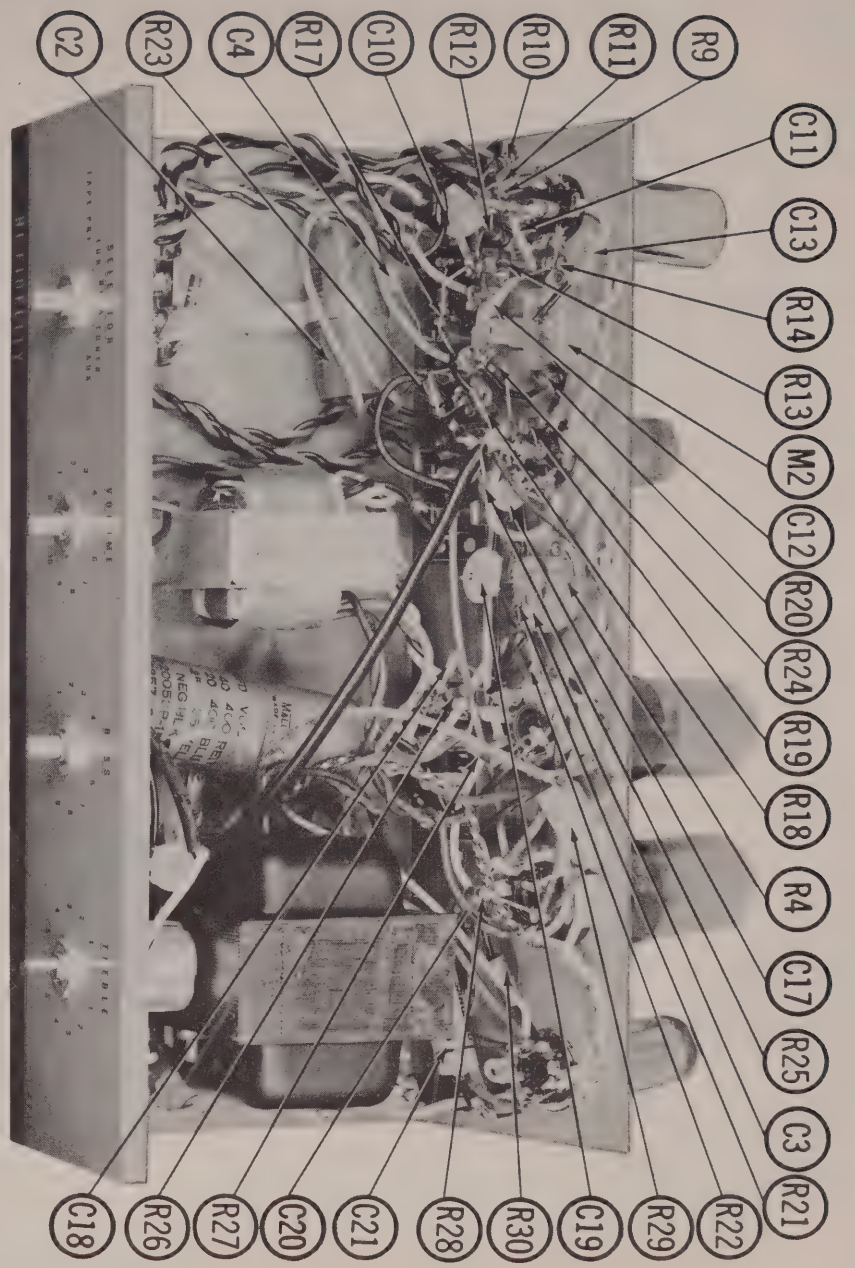
ITEM No.	PART NAME	Bell Sound PART No.	NOTES
M1	Switch		Input Selector, Rotary, Wafer Type
M2	Switch		Rumble Filter, SPST, Slide Type

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW

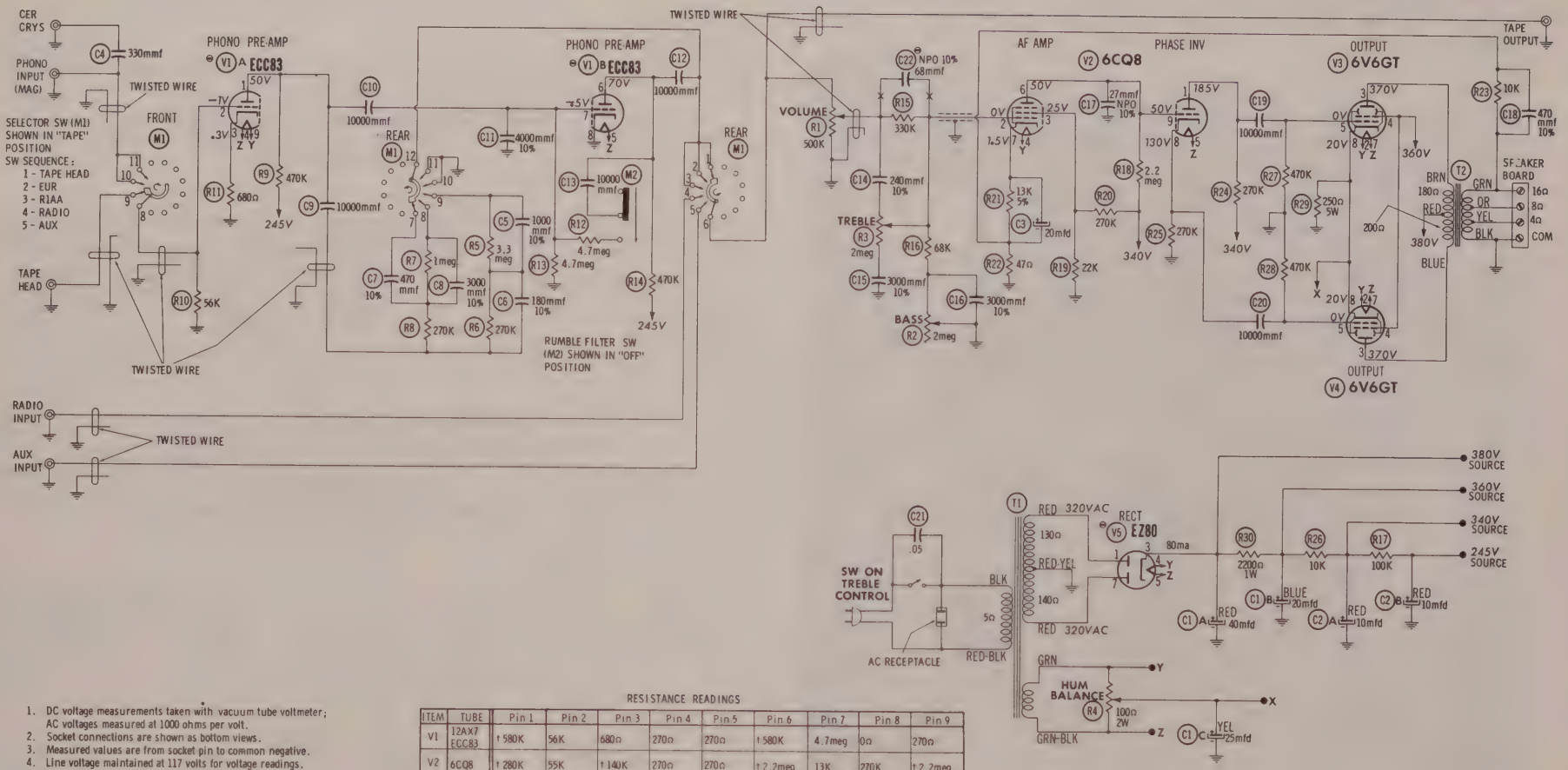


PACEMAKER MODEL 2215

SET 423 FOLDER 16

PACEMAKER MODEL 2215

FOLDER 16



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7 ECC83	†580K	56K	680Ω	270Ω	270Ω	†580K	4.7meg	0Ω	270Ω
V2	6CQ8	†280K	55K	†140K	270Ω	270Ω	†2.2meg	13K	270K	†2.2meg
V3	6V6GT	TP	270Ω	†180Ω	†2200Ω	470K	TP	270Ω	250Ω	
V4	6V6GT	TP	270Ω	†200Ω	†2200Ω	470K	TP	270Ω	250Ω	
V5	6V4 EZ80	130Ω	NC	¶	270Ω	270Ω	NC	140Ω	NC	NC

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM PIN 3 OF V5.

NC NO CONNECTION TP TIE POINT

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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with CIRCUITRACE*

PACKARD-BELL MODEL 6RT1

TRADE NAME	Packard-Bell Model 6RT1
MANUFACTURER	Packard-Bell Co., Service Div., 11th & Hope Sts., Los Angeles 15, California
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	9 Volts DC
TUNING RANGE—BROADCAST	535 - 1620KC
RATING	8.9MA @ 9 Volts DC (No Signal, Min. Volume) 9.5MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1620KC	1620KC	"	A3	"
3.		"	600KC	600KC	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang. Repeat steps 2 and 3.
4.		"	1500KC	Tune to 1500KC signal	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
5.		"	600KC	Tune to 600KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output by sliding coil on rod.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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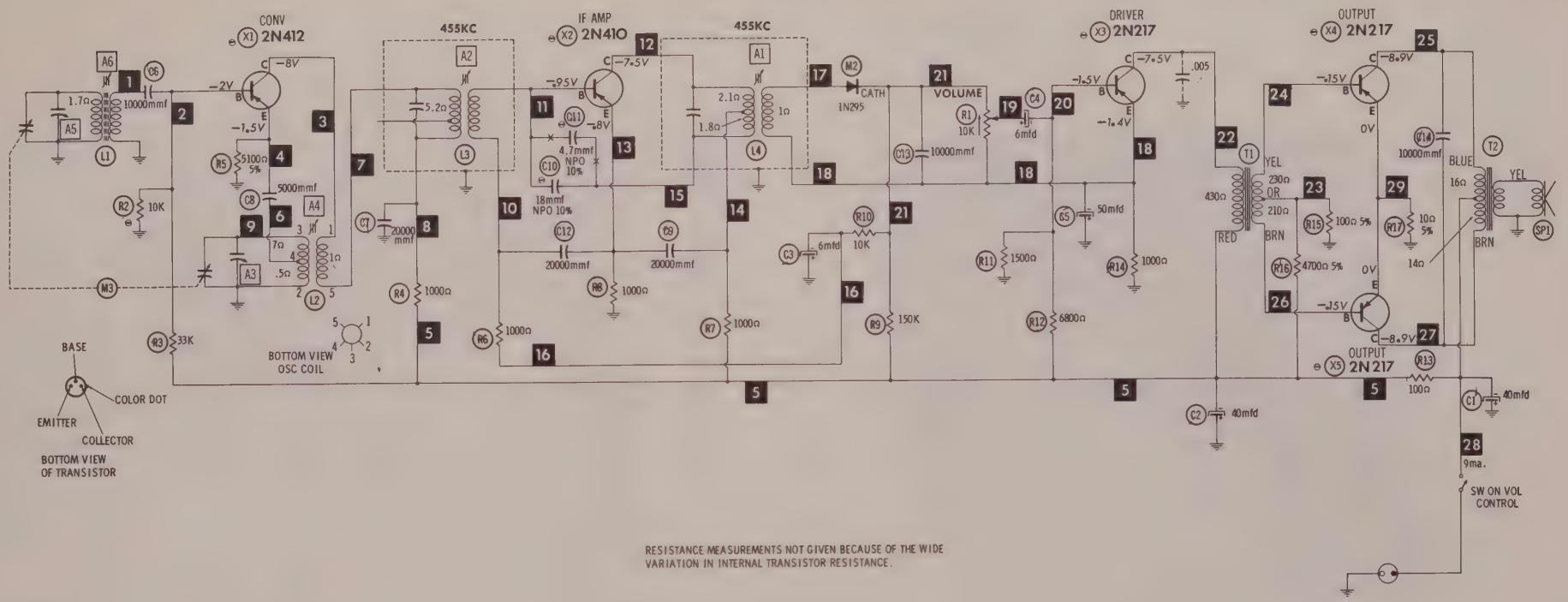
PACKARD-BELL MODEL 6RT1
PACKARD-BELL MODEL 6RT1
SET 423 FOLDER 17



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

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PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N412	Converter		2N412	2N486	2N412	PNP Note 1
X2	2N410	IF Amplifier		2N410	2N483	2N410	PNP Note 2
X3	2N217	Driver	CBS-2N180	2N217	2N362	2N217	PNP Note 3
X4	2N217	Output	CBS-2N180	2N217	2N632	2N217	PNP Note 4
X5	2N217	Output	CBS-2N180	2N217	2N632	2N217	PNP Note 4

Note 1. Alternate types: 2N219, 2N415, 2N271, CK766
Note 2. Alternate types: 2N218, 2N414A, 2N112A, CK760A
Note 3. Alternate types: 2N362, 2N132, CK882
Note 4. Alternate types: 2N360, 2N136A, CK888

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Packard-Bell PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	40	10	24151A	PWE10040	NL50-10	TT15X40	ML40-15	MQ-0530	TE-1160
C2	40	10	24151A	PWE10040	NL50-10	TT15X40	ML40-15	MQ-0530	TE-1160
C3	6	3	24149A	XPP-3006	NL5-6	TT6X5	ML6-6		TE-1153
C4	6	3	24149A	XPP-3006	NL5-6	TT6X5	ML6-6		TE-1153
C5	50	3	24150A	XPP-3050	NL50-3	TT6X50	ML50-3	MQ-350	TE-1100

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	Packard-Bell PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	10000		23612A	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C7	20000		23613A	BPD-02	DD-102	BYB6S2		5HK-S2	
C8	5000		23611	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C9	20000		23613A	BPD-02	DD-203	BYB6S2		5HK-S2	
C10	18					C10Q18C			NPO 10% ①②
C11	4.7			NPO-DI 4.7	DTZ-4R7	C10V4.7C	ZT-5547	5TCCB-V47	NPO 10% ③
C12	20000		23613A	BPD-02	DD-203	BYB6S2		5HK-S2	
C13	10000		23612A	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C14	10000		23612A	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	

① Some versions use 22mmf in this application (Part #23617).
② Some versions use a variable trimmer in this application (Part #23437).
③ When C10 is 22mmf or a variable capacitor, C-11 is not used.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Packard-Bell PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	10K	1/4	25051B					Volume and Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Packard-Bell PART No.	NOTES
	OHMS	WATT		
R2	10K		73037	Note 1
R3	33K		73043	
R4	1000Ω		73025	
R5	5100Ω 5%		73080-1	
R6	1000Ω		73025	
R7	1000Ω		73025	
R8	1000Ω		73025	
R9	150K		73051	

ITEM No.	RATING		Packard-Bell PART No.	NOTES
	OHMS	WATT		
R10	10K		73037	
R11	1500Ω		73027	
R12	6800Ω		73035	
R13	150Ω		73012	
R14	1000Ω		73025	
R15	100Ω 5%		73013-1	
R16	4700Ω 5%		73033-1	
R17	10Ω 5%		73001-1	

Note 1. When X1 is type 2N271, 2N415 or CK766, R2 is 15K (Part #73039).

PRINTED BOARD

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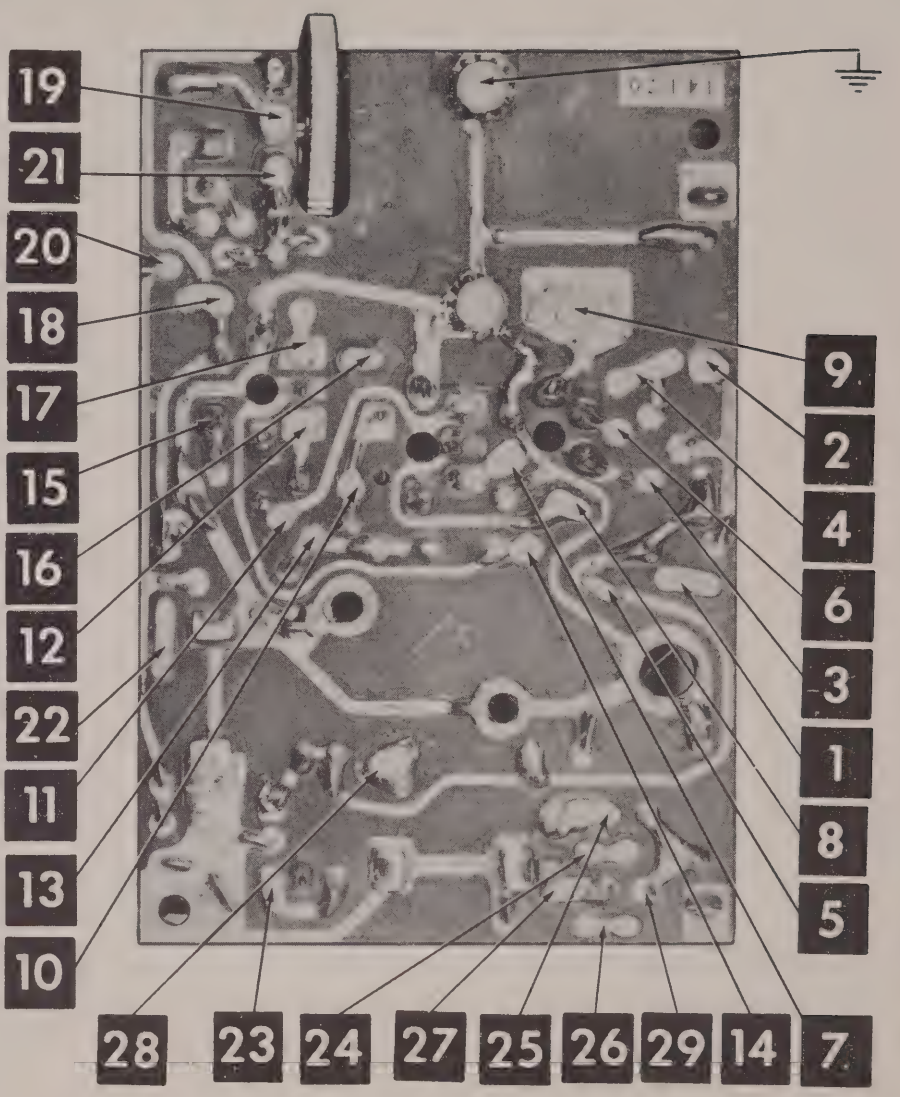
*TRADE MARK



PACKARD-BELL MODEL 6RT1

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		Packard-Bell PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Stick	29356A					
L2	Osc. Coil	29239B					
L3	Input IF	29094B					
L4	Output IF	29095B					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.2	: 1	89484B	GH112		TA-30	TR-2		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	4000Ω CT	20Ω	89485B							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Packard-Bell PART No.	QUAM PART No.	
SP1	2 3/4"	PM	20Ω	83119C		

BATTERIES

ITEM No.	VOLTAGE	Packard-Bell PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	16010		2N6		246		M-1602	Carbon Type
	9V	16011						TR-246R	Mercury Type

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Packard-Bell PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N295		1N64	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M3	Tuning Cap. Printed Board	23551 14170B	2 Gang (Ant. 12-135mmf)

CABINETS & CABINET PARTS

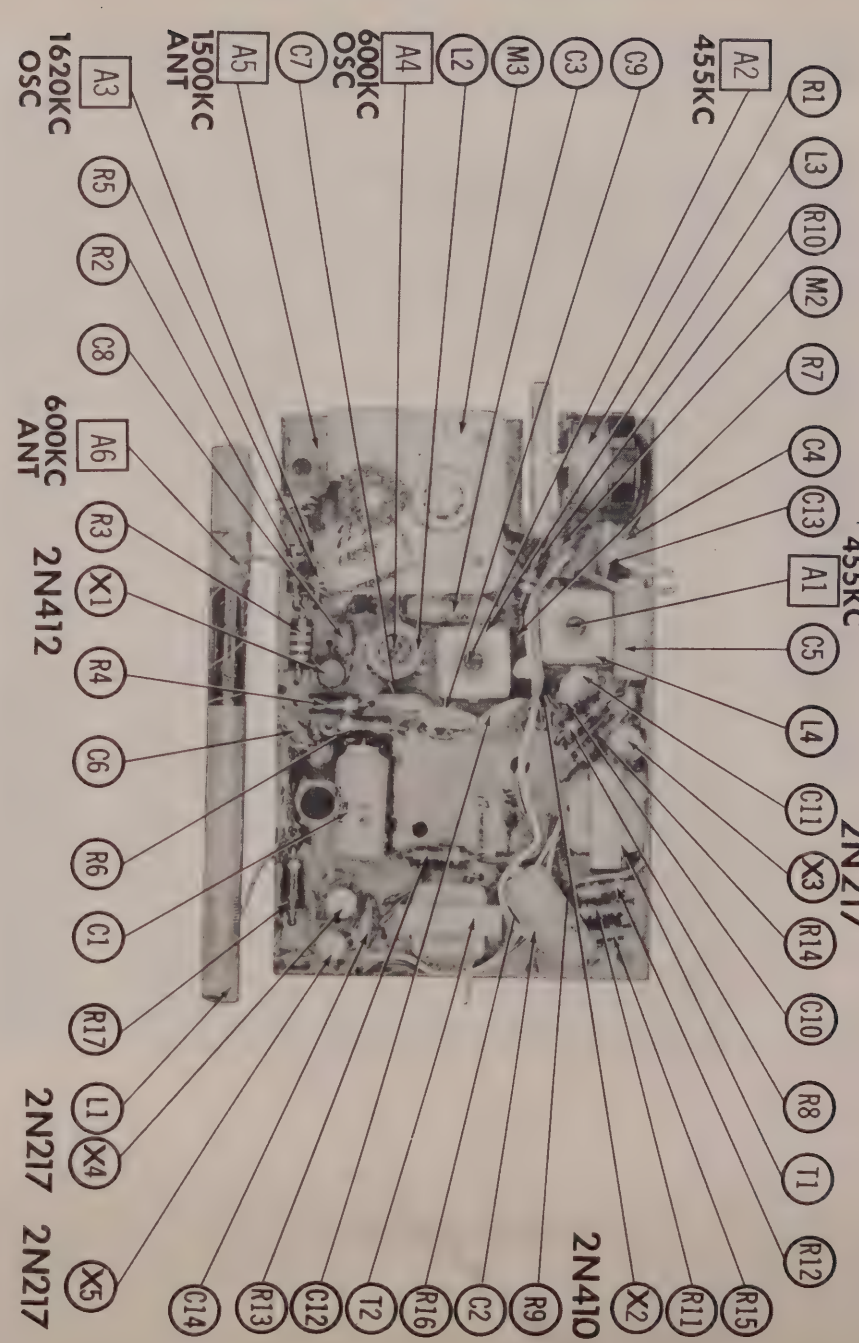
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	52228A	Tuning
Knob	52222A	Volume
Cabinet	21147A	Leather Case

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



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PHILCO MODELS T-5, T-500

PHILCO MODELS T-5, T-500

TRADE NAME	Philco Models T-5 (Code 124), T-500 (Code 124)
MANUFACTURER	Philco Corp., Tioga & "C" Streets, Philadelphia, Pa.
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	6 Volts DC
RATING	20ma @ 6 Volts DC
TUNING RANGE—BROADCAST	535-1620KC

PHILCO MODELS T-5, T-500

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to antenna terminal of tuning gang. Low side to chassis.	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3	Adjust for maximum output.
2.		Loop	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A5	"
4.		"	600KC	600KC	"	A6	Mount printed board on cabinet. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang. Repeat steps 2, 3 and 4.

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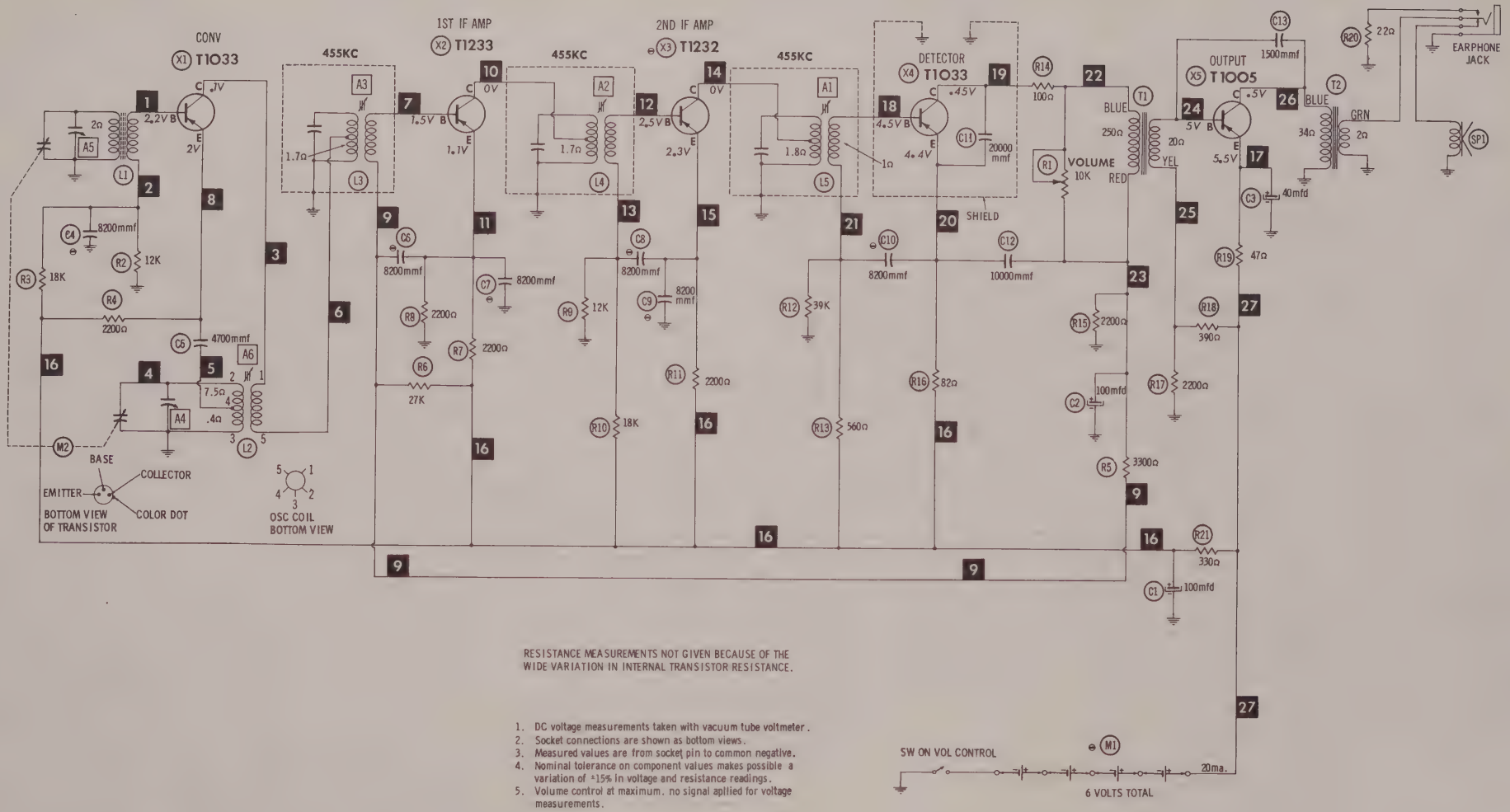

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE*
*TRADE MARK

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PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	T1033	Converter			2N486		PNP
X2	T1233	1st IF Amp.			2N483		PNP
X3	T1232	2nd IF Amp.			2N483		PNP ①
X4	T1033	Detector			2N362		PNP
X5	T1005	Output			2N631		PNP

① Type T1233 used in Model T-5.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	100	6	30-2588-4	PWE6100	NL100-6	TT6X100	ML100-6	MQ-680	TE-1102
C2	100	3	30-2588-2	PWE3100	NL100-6	TT6X100	ML100-3		TE-1102
C3	40	6	30-2588-3	PWE6040	NL40-6	TT6X40	ML40-6	MQ-650	TE-1095

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	8200								①
C5	4700		30-1262-2	BPD-0047	DD-472	BYA10D47M	UC-5247	5HK-D47	
C6	8200								①
C7	8200								①
C8	8200								①
C9	8200								①
C10	8200								①
C11	20000		30-1238-5	BPD-02	DD-203	BYB6S2		5HK-S2	
C12	10000		30-1238-1	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C13	1500		30-1262-8	BPD-0015	DD-152	BYA10D15	DC5215	5HK-D15	

① Some versions may use 8000mmf in this application (Part #30-1262-1).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	10K	½	33-5583-2					Volume and Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R2	12K		66-3128340	
R3	18K		66-3188340	
R4	2200Ω		66-2228340	
R5	3300Ω		66-2338340	
R6	27K		66-3278340	
R7	2200Ω		66-2228340	
R8	2200Ω		66-2228340	
R9	12K		66-3128340	
R10	18K		66-3188340	
R11	2200Ω		66-2228340	

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R12	39K		66-3398340	
R13	560Ω		66-1568340	
R14	100Ω		66-1108340	
R15	2200Ω		66-2228340	
R16	82Ω		66-0828340	
R17	2200Ω		66-2228340	
R18	390Ω		66-1398340	
R19	47Ω		66-0478340	
R20	22Ω		66-0228340	
R21	330Ω		66-1338340	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		PHILCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Stick	76-10204	14-9005				
L2	Osc. Coil	32-4669-3					
L3	1st IF	32-4708-7					
L4	2nd IF	32-4708-7					
L5	3rd IF	32-4708-8					

PRINTED BOARD

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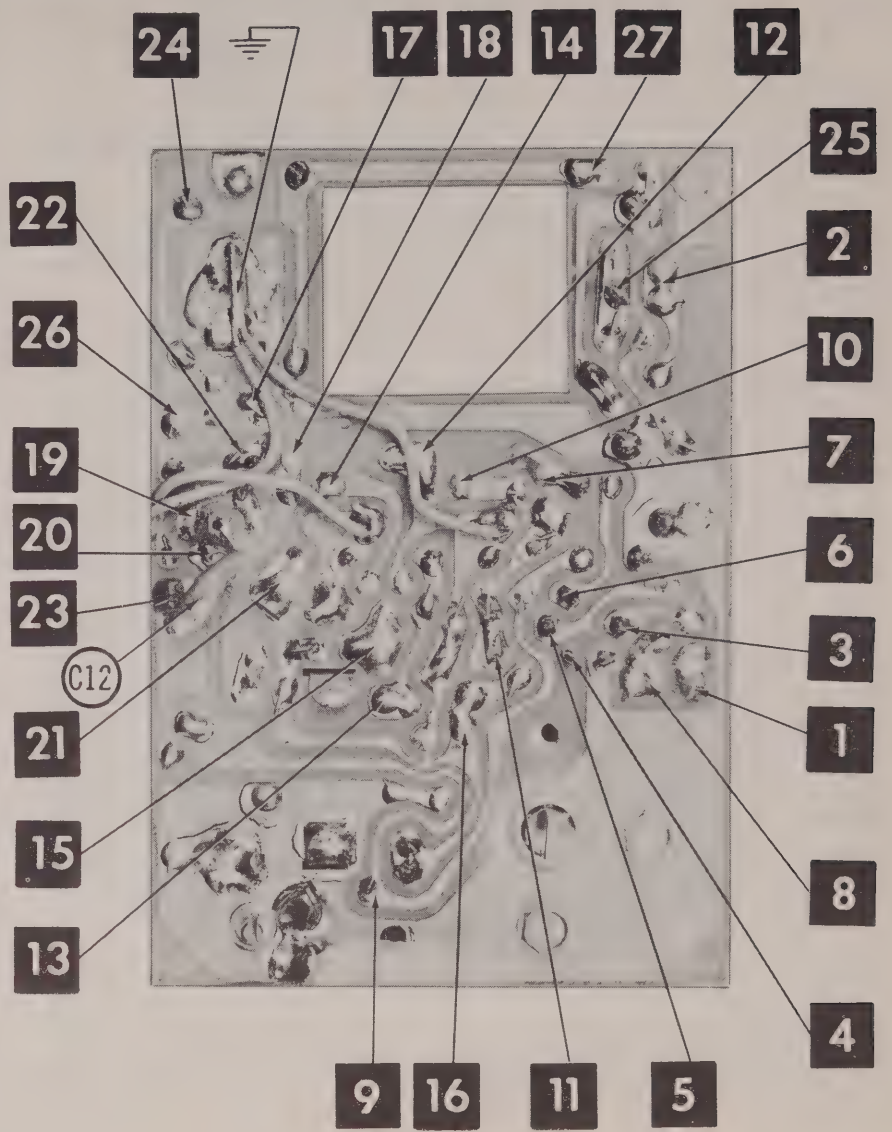


PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO PRI.	TURNS RATIO SEC.	REPLACEMENT DATA PHILCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	3.2	: 1	32-8820						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA PHILCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	265Ω	14-16Ω	32-8819						TY-57X ①	① Use original channel frame.

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA PHILCO PART No.	QUAM PART No.	NOTES
SP1	2 3/4"	PM	14-16Ω	36-1664-3		

BATTERIES

ITEM No.	VOLTAGE	PHILCO PART No.	REPLACEMENT DATA BURGESS "A"	BURGESS "B"	EVEREADY "A"	EVEREADY "B"	MALLORY "A"	MALLORY "B"	NOTES
M1	6V			Z ①		915 ① E9 ①②		M-15R ① ZM-9①②	① 4 Used ② Mercury

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M2	Tuning Cap. Printed Board	31-2788 54-6447	2 Gang (Ant. 11-135mmf)

CABINETS & CABINET PARTS

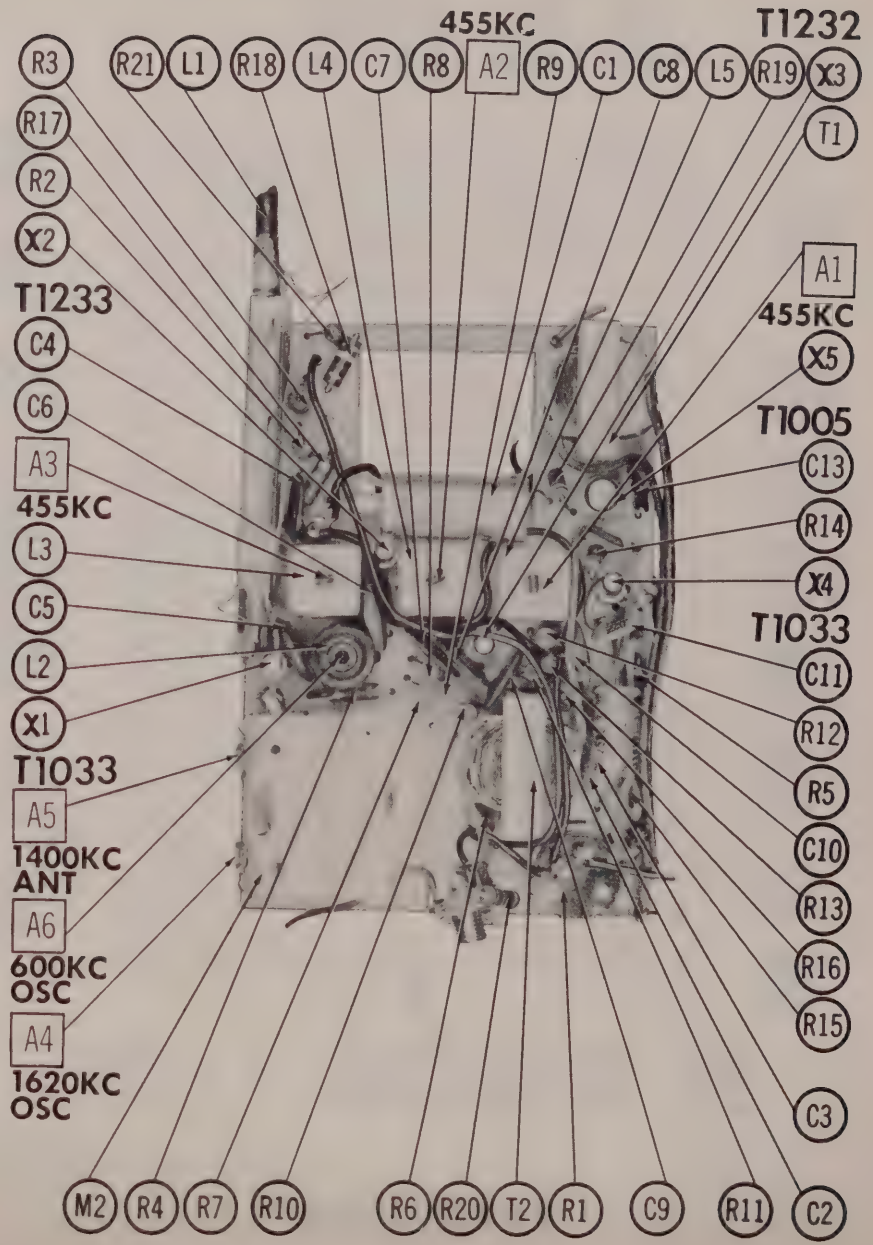
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Bezel	28-11973	
Knob	54-6486-1	Tuning
Knob	54-6487-1	On-Off-Volume
Cabinet	11268	Ivory & Black
Cabinet	11268-1	Pink & Black
Back	54-6485-1	Cabinet
Earphone	326-8006	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



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RCA VICTOR MODEL 1BT58 (Ch. RC-1156B)

RCA VICTOR MODEL 1BT58 (Ch. RC-1156B)

RCA VICTOR MODEL 1BT58 (Ch. RC-1156B)

TRADE NAME	RCA Victor Model 1BT58 (Ch. RC-1156B)
MANUFACTURER	RCA Victor Radio & "Victrola" Div., Radio Corp. Of America, Camden 8, N. J.
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	4.5 Volts DC
TUNING RANGE—BROADCAST	540-1600KC
RATING	8.8MA @ 4.5 Volts DC (No Signal, Min Vol.) 22MA @ 4.5 Volts DC (Signal, Normal Vol.)

ALIGNMENT INSTRUCTIONS

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	005MF	High side to Antenna Stator Lug of Tuning Gang. Low Side To Chassis	455KC (400~ Mod)	Tuning Gang Fully Open	Across Voice Coil	A1, A2 A3	Adjust for Maximum Output
2.		Loop	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune For 1400KC Signal	"	A5	"
4.		"	600KC	600KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output, while rocking tuning gang. Repeat Steps 2, 3, & 4

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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SET 423 FOLDER 19

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N411	Converter		2N411	2N486	2N411	PNP
X2	2N409	1st IF Amplifier		2N409	2N483	2N409	PNP
X3	2N409	2nd IF Amplifier		2N409	2N483	2N409	PNP
X4	2N407	Detector	2N180	2N407	2N362	2N407	PNP
X5	2N407	Driver	2N180	2N407	2N362	2N407	PNP
X6	2N270	Output	2N180	2N270	2N360	2N270	PNP
X7	2N270	Output	2N180	2N270	2N360	2N270	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	RCA VICTOR PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	100	10	103400	PWE10100	NL100-10	TT15X100	ML100-15		TE-1162
C2	100	10	103400	PWE10100	NL100-10	TT15X100	ML100-15		TE-1162
C3	100	10	103400	PWE10100	NL100-10	TT15X100	ML100-15		TE-1162
C4	100	10	103400	PWE10100	NL100-10	TT15X100	ML100-15		TE-1162
C5	100	10	103400	PWE10100	NL100-10	TT15X100	ML100-15		TE-1162
C6	10	10	101613	PWE10010	NL10-10	TT12X10	ML10-15	MQ-0510	TE-1114
C7	100	10	103400	PWE10100	NL100-10	TT15-100	ML100-15		TE-1162

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	RCA VICTOR PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C8	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C9	.01	200	101000				GEM-1611		10%
C10	6		74182						NPO ± 1mmf
C11	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C12	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C13	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C14	3		77277	NPO-SI3			ZT-553		NPO ± 1mmf
C15	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C16	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C17	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C18	.22	200	100650				GEM-2022		10%

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA VICTOR PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1500Ω	½	105894					Volume & Switch

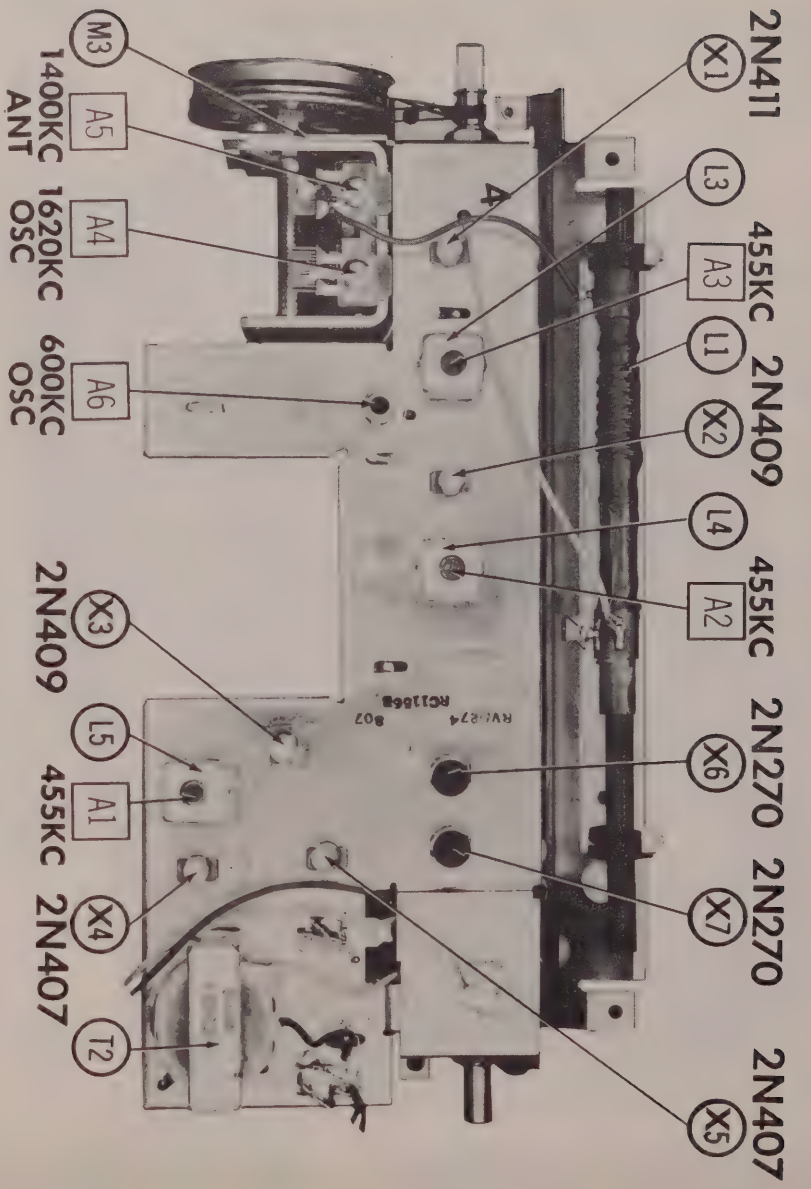
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		RCA VICTOR PART No.	NOTES
	OHMS	WATT		
R2	15K		502315	
R3	6800Ω		502268	
R4	180K		502418	
R5	1000Ω		502210	
R6	2200Ω		502222	
R7	1000Ω		502210	
R8	1000Ω		502210	
R9	1000Ω		502210	
R10	15K		502315	
R11	6800Ω		502268	
R12	1000Ω		502210	
R13	1000Ω		502210	
R14	220Ω		502122	

ITEM No.	RATING		RCA VICTOR PART No.	NOTES
	OHMS	WATT		
R15	100Ω		502110	
R16	1000Ω		502210	
R17	22K		502322	
R18	4700Ω		502247	
R19	470Ω		502147	
R20	1000Ω		502210	
R21	10Ω		502010	
R22	4300Ω 5%		32478	
R23	390Ω		502139	
R24	270Ω cold		103021	
R25	56Ω		502056	
R26	56Ω		502056	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		RCA VICTOR PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Stick	101650					
L2	Osc. Coil	105901	14-9010				
L3	1st IF	105904	16-9004				
L4	2nd IF	105905	16-9003				
L5	3rd IF	105906	16-9002				

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA VICTOR PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2	: 1	105899				TR-66		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	RCA VICTOR PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	100Ω CT	3-4Ω	105900							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	RCA VICTOR PART No.	QUAM PART No.	
SP1	4"x 6"	PM	3-4Ω	102634	46A07	

BATTERIES

ITEM No.	VOLTAGE	RCA VICTOR PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	4.5V	VS036		21R		950①		M-20	3 Used

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		RCA VICTOR PART No.	CBS PART No.	SYLVANIA PART No.	
M2		101615	1N64	1N295	Overload (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	RCA VICTOR PART No.	NOTES
M3	Tuning Cap	101653	2 Gang (Ant. 17-185mmf, Osc. 17-100mmf)

CABINETS & CABINET PARTS

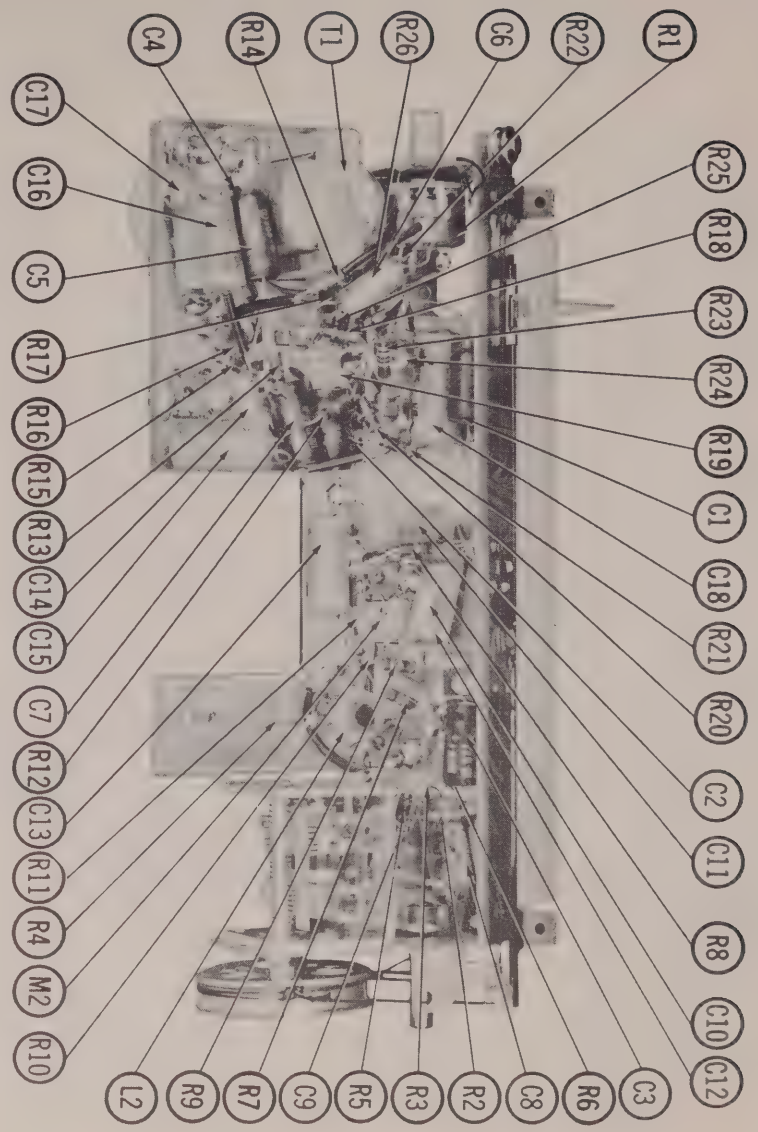
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	105902	Includes Spring, Tuning
Knob	105903	Includes Spring, On-Off-Volume
Handle	105893	Less Supports And Links
Cabinet Assembly	X4330	Less Handle, Support, And Links
Dial Pointer	105909	
Dial	105896	With Calibrations
Dial Window	105895	

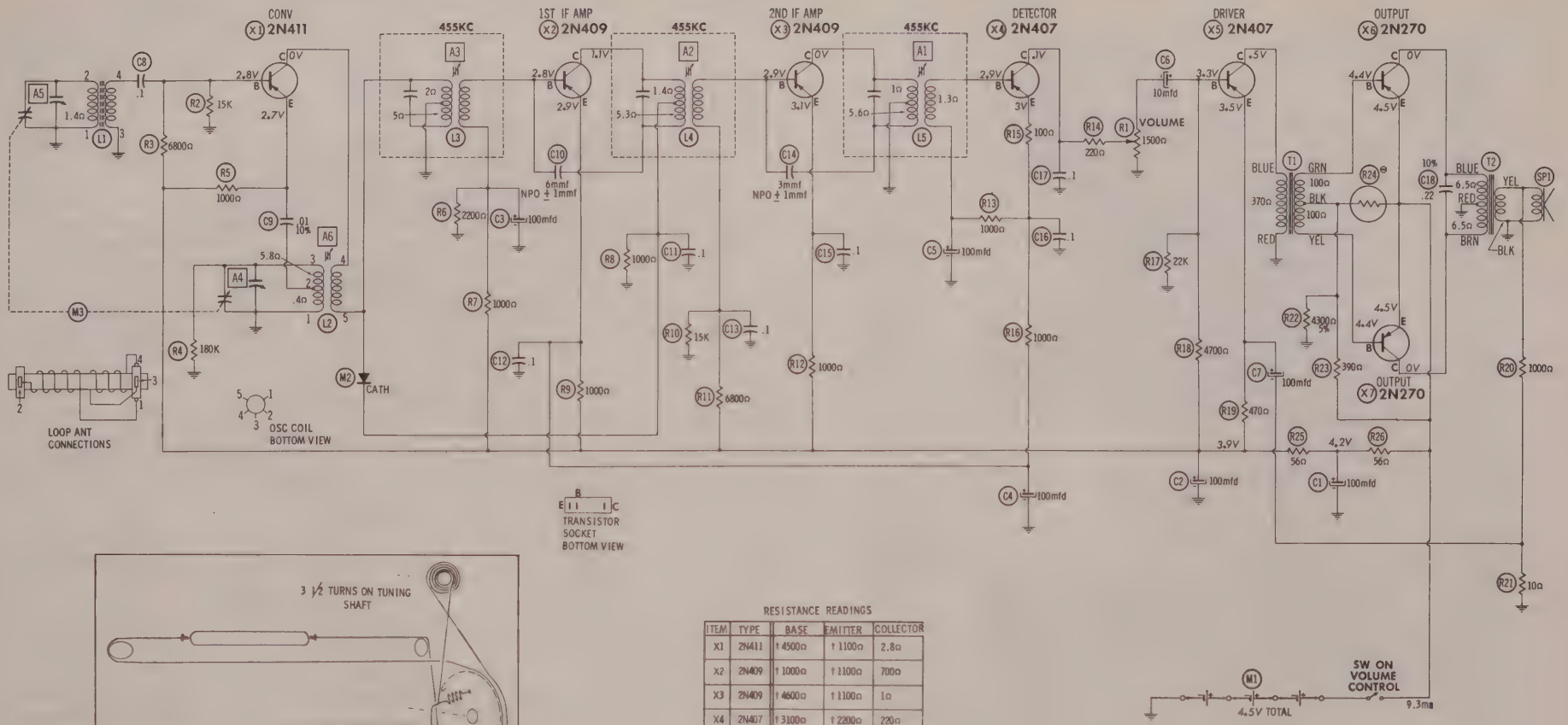
WIRING DATA

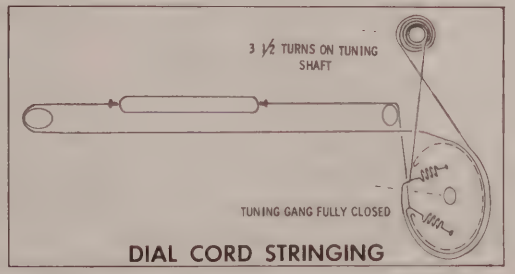
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—BOTTOM VIEW



RCA VICTOR MODEL
1BT58 (Ch. RC-1156B)
FOLDER 19





RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	2N411	†4500Ω	†1100Ω	2.8Ω
X2	2N409	†1000Ω	†1100Ω	700Ω
X3	2N409	†4600Ω	†1100Ω	1Ω
X4	2N407	†3100Ω	†2200Ω	220Ω
X5	2N407	†3800Ω	†580Ω	370Ω
X6	2N270	†230Ω	†0Ω	6.5Ω
X7	2N270	†230Ω	†0Ω	6.5Ω

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS
† MEASURED FROM JUNCTION OF R23 AND R26

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

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PHOTOFACT* Folder

ROLAND MODEL 71-483 (TW6)

ROLAND MODEL
71-483 (TW6)

ROLAND MODEL
71-483 (TW6)

TRADE NAME	Roland Model 71-483 (TW6)
MANUFACTURER	Roland Radio Corp., 12-30 Anderson Ave., Mt. Vernon, N. Y.
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	9 Volts DC
TUNING RANGE—BROADCAST	540-1620KC
RATING	8.6MA @ 9 Volts DC (No Signal, Min. Volume) 9.5MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High Side To Base Of 2N411 (X1). Low Side To Chassis	455KC (400~ Mod)	Tuning Gang Fully Open	Across Voice Coil	A1, A2, A3	Adjust For Maximum Output
2.		Loop	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	540KC	Tuning Gang Fully Closed	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat Steps 2 & 3
4.		"	1400KC	Tune For 1400KC Signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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SET 423 FOLDER 20

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N411	Converter		2N411	2N486	2N411	PNP
X2	2N409	1st IF Amplifier		2N409	2N483	2N409	PNP
X3	2N409	2nd IF Amplifier		2N409	2N483	2N409	PNP
X4	R-67	Detector			CK879	2N34	PNP
X5	2N405	Driver		2N405	2N362	2N405	PNP
X6	2N306	Output	CBS-2N438			2N306	NPN
X7	2N306	Output	CBS-2N438			2N306	NPN

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ROLAND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	40	12	①	XPP-12040	NL50-10	TT15X40	ML40-15		R2329 *
C2	10	12	581031	XPP-12010	NL10-15	TT12X10	ML10-15		TE-1128
C3	8	12	②	XPP-12008	NL10-15	TT12X10	ML8-15		TE-1127.3
C4	10	12	581031	XPP-12010	NL10-15	TT12X10	ML10-15		TE-1128

① Some versions may use a 50mfd (Part #581033). * Non-catalog item.
② Some versions may use a 5mfd (Part #581034).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	ROLAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	20000		515040	BPD-02	DD-203	BYB6S2		5HK-S2	
C6	20000		515040	BPD-02	DD-203	BYB6S2		5HK-S2	
C7	20000		515040	BPD-02	DD-203	BYB6S2		5HK-S2	
C8	20000		515040	BPD-02	DD-203	BYB6S2		5HK-S2	
C9	20000		515040	BPD-02	DD-203	BYB6S2		5HK-S2	
C10	4.7		515010	NPO-DI4.7	DTN-4R7	C10V47C	ZT-5547	5TCCB-V47	
C11	4.7		515010	NPO-DI4.7	DTN-4R7	C10V47C	ZT-5547	5TCCB-V47	
C12	20000		515040	BPD-02	DD-203	BYB6S2		5HK-S2	
C13	20000		515040	BPD-02	DD-203	BYB6S2		5HK-S2	
C14	50000		515039	BPD-05				TG-S50	①
C15	50000		515039	BPD-05				TG-S50	①
C16	2000		552025	BPD-002	DD-202	BYA10D2	DC522	5HK-D2	
C17	50000		515039	BPD-05				TG-S50	

① When C14 is 100000mmf, C15 is not used.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ROLAND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	5000Ω	½	368028					Volume & Switch

RESISTORS

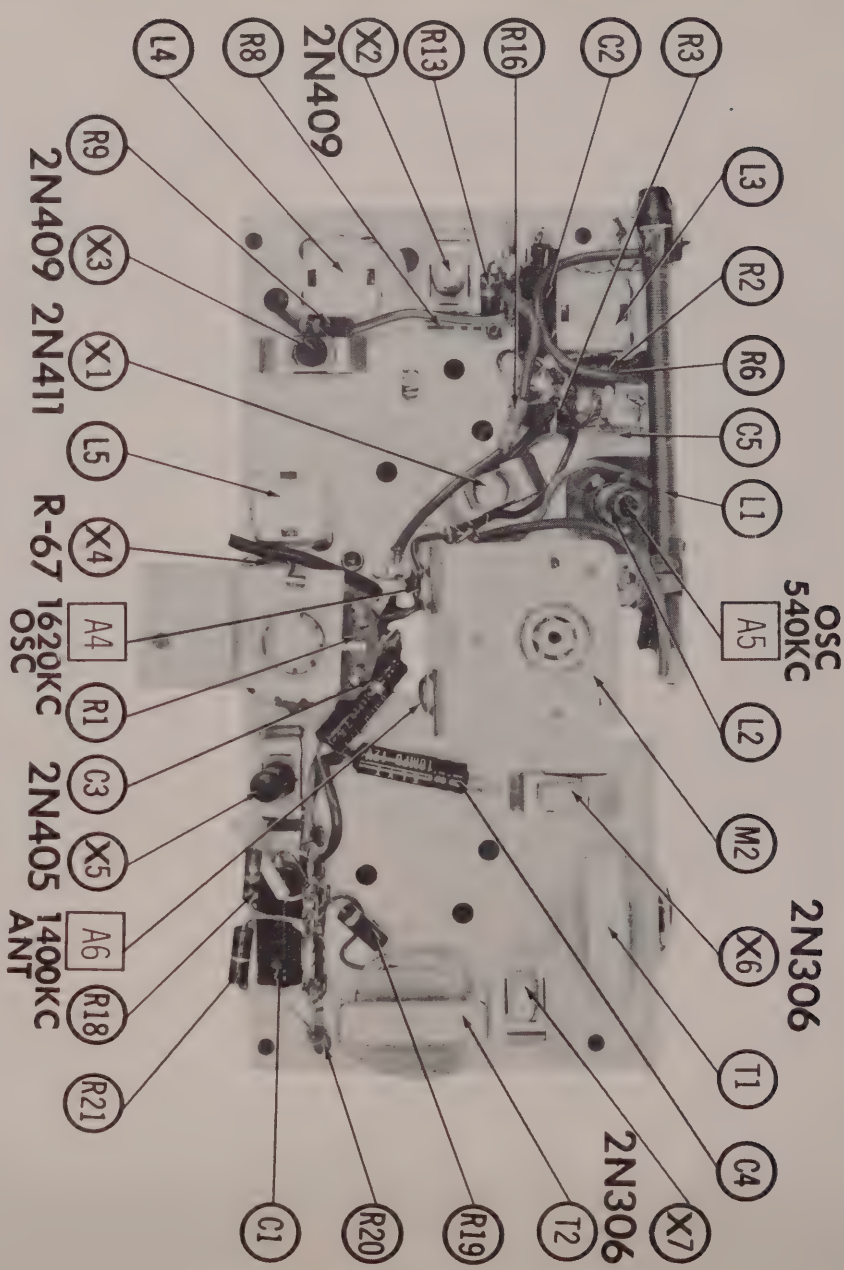
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ROLAND PART No.	NOTES
	OHMS	WATT		
R2	30K			①
R3	18K			
R4	22Ω			
R5	3900Ω			
R6	2200Ω			
R7	330Ω			
R8	4700Ω			
R9	47K			
R10	22K			
R11	2200Ω			
R12	2200Ω			

ITEM No.	RATING		ROLAND PART No.	NOTES
	OHMS	WATT		
R13	100K			
R14	100Ω			
R15	1.2meg			
R16	3300Ω			
R17	6800Ω			
R18	30K			①
R19	1000Ω			
R20	4700Ω			
R21	100Ω			
R22	12Ω			

① Some versions use 33K in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		ROLAND PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loopstick	464029					
L2	Osc. Coil	455076					
L3	1st IF	450024	16-9002	BC-321	2041		
L4	2nd IF	450024	16-9002	BC-321	2041		
L5	3rd IF	450025	16-9002	BC-323	2042		

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ROLAND PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.5	: 1	430490						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ROLAND PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	550Ω CT	1-2Ω	430500							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ROLAND PART No.	QUAM PART No.	
SP1	3"	PM	3-4Ω	409008		
SP2	3"	PM	3-4Ω	409008		

BATTERIES

ITEM No.	VOLTAGE	ROLAND PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			Z①		915① E9①②		M-15R① ZM9①②	① 6 Used ② Mercury Type

MISCELLANEOUS

ITEM No.	PART NAME	ROLAND PART No.	NOTES
M2	Tuning Cap.		2 Section (Ant. 7-123mmf, Osc. 7-124mmf)

CABINETS & CABINET PARTS

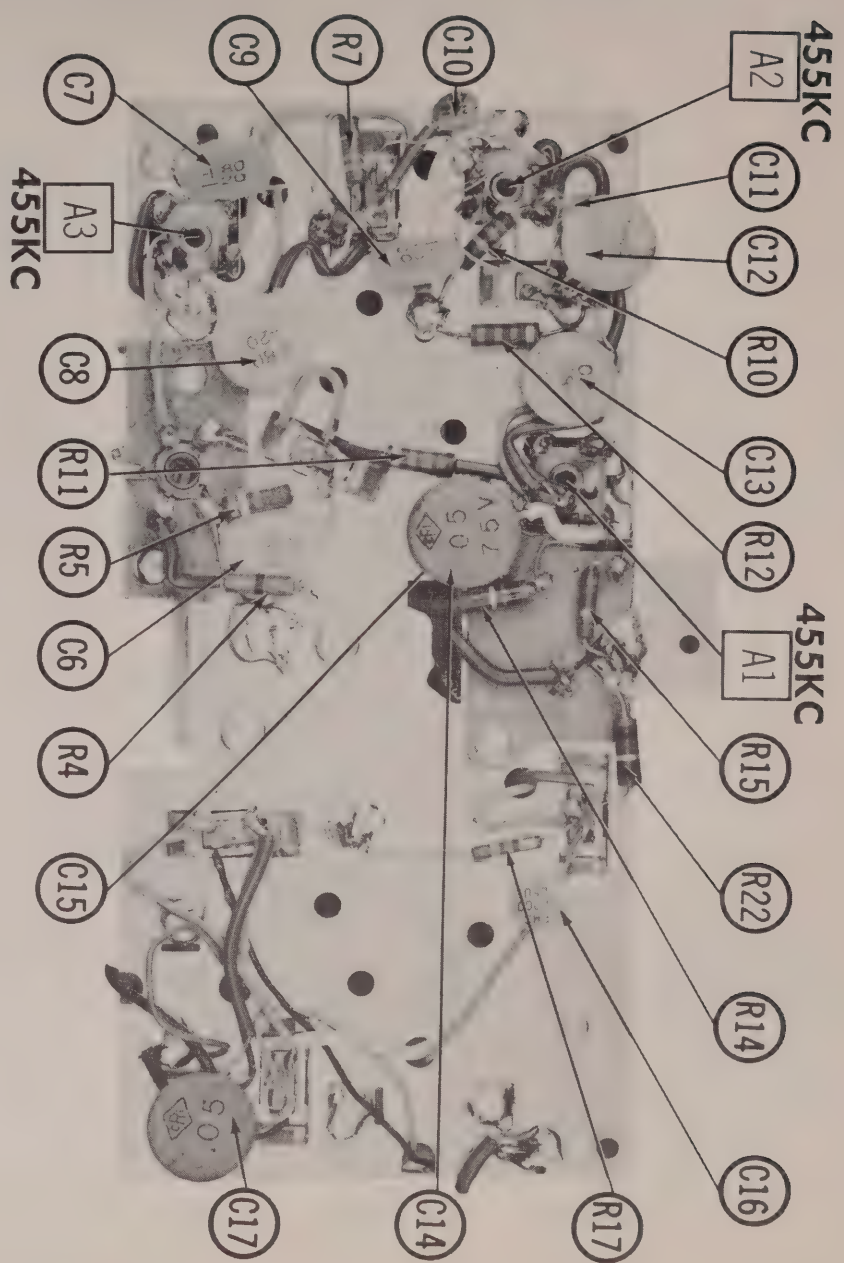
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	272246	Tuning, Red
Knob	272255	Tuning, Charcoal
Knob	272254	Tuning, Turquoise
Knob	272249	On-Off-Volume, Red
Knob	272258	On-Off-Volume, Charcoal
Knob	272257	On-Off-Volume, Turquoise
Cabinet	250261	Front, White
Cabinet	250262	Front, Turquoise
Cabinet	250263	Front, Charcoal
Cover	250253	Cabinet
Handle	760967	

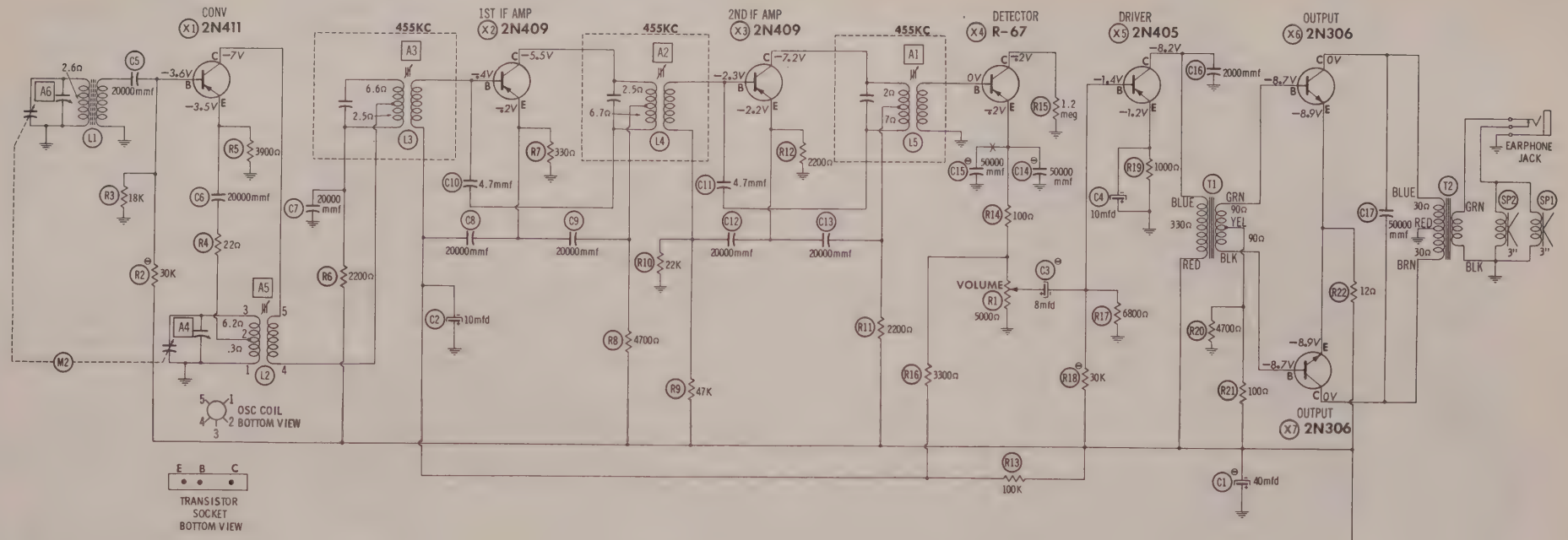
WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—BOTTOM VIEW



ROLAND MODEL 71-483 (TW6)
FOLDER 20



RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	2N411	13K	3900Ω	†2200Ω
X2	2N409	5000Ω	330Ω	†4700Ω
X3	2N409	14K	2200Ω	†2200Ω
X4	R-67	•	•	•
X5	2N405	5500Ω	1000Ω	†330Ω
X6	2N306	†190Ω	†12Ω	30Ω
X7	2N306	190Ω	†12Ω	30Ω

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal applied for voltage measurements.

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
• RESISTANCE MEASURED FROM X4 TERMINALS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
† MEASURED FROM NEGATIVE TERMINAL OF C1.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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STROMBERG-CARLSON MODELS PF-530, PF-535

STROMBERG-CARLSON MODELS
PF-530, PF-535

STROMBERG-CARLSON MODELS
PF-530, PF-535

TRADE NAME	Stromberg-Carlson Models PF-530, PF-535
MANUFACTURER	Stromberg-Carlson National Service Dept., 1400 N. Goodman St., Rochester 3, N.Y.
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES (Four)	Types 12AX7 AF Amp.-Phase Inv., (2) 6V6GT Output, 6X5GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .40 Amp. @ 117 Volts AC (39 Watts Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR V-M 959-PHOTOFACT SET 396 FOLDER 13.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp. -Phase Inv.	12AX7	
V2	Output	6V6GT	

ITEM No.	USE	TYPE	NOTES
V3	Output	6V6GT	
V4	Rectifier	6X5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	Stromberg-Carlson PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲20	350	111000-004	AFH4-57	D0520	FP444	TMQ-83	Q-250	TVL-4667
B	■20	350							
C	▲20	350							
D	25	25							
C2	16	25AC	111000-006	AC-PRS25 V20	BR3015 † BR3015 †	TC47 † TC47 †	TD-30-150 † TD-30-150 †	MT-1530 † MT-1530 †	R2691 *

† Connect negative leads together. * Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	4700			BPD-0047	DD-472	BYA10D47M	UC-5247	5HK-D47	
C4	4700			BPD-0047	DD-472	BYA10D47M	UC-5247	5HK-D47	
C5	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C6	.02	400		P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C7	.0022	600		P688N-0022	D6-222	CUB6D22	GEM-6222	6TM-D22	
C8	.02	400		P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	Stromberg-Carlson PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	145000-013	BT-165		Q18-137XX	UDT-289	Volume, Taps @ 300K & 600K
B	Shaft			Not Req.		Not Req.	Not Req.	
R2A	1meg	½	145000-015	B-70	A47-1meg-Z	Q13-137	U53	Treble
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	1meg	½	145000-015	B-70	A47-1meg-Z	Q13-137	U53	Bass, Note 1
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

Note 1. Part #145000-014 may be used in some versions.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

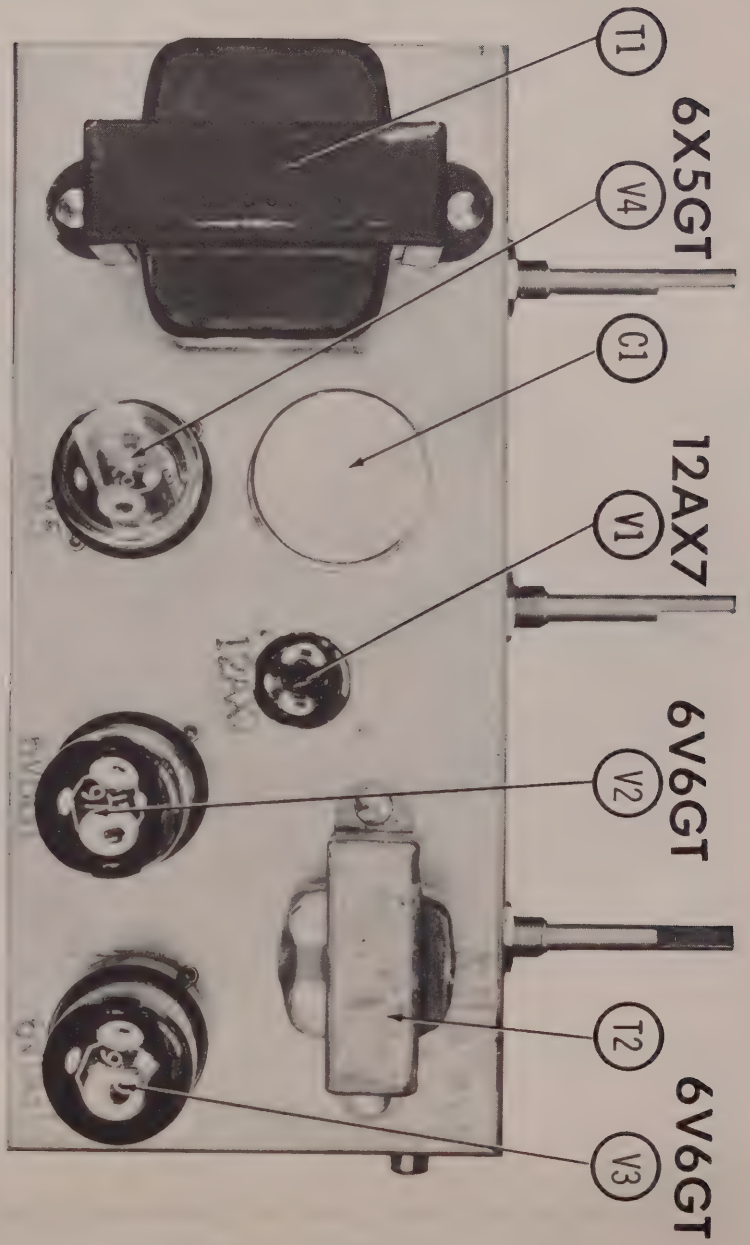
ITEM No.	RATING OHMS	RATING WATT	Stromberg-Carlson PART No.	NOTES
R4	100K			
R5	4. 7meg			
R6	220K			
R7	1meg			
R8	220K			
R9	100K			

ITEM No.	RATING OHMS	RATING WATT	Stromberg-Carlson PART No.	NOTES
R10	1000Ω			
R11	220K			
R12	470K			
R13	390Ω	2		
R14	470K			
R15	470Ω	2		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @.40A	540VCT @.060A	6.3V @1.6A	161000-034						

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	4300Ω CT	6-8Ω	161000-033	Z1402	A-2901	AU-600	A-3823	24S61	S-53X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Stromberg-Carlson PART No.	QUAM PART No.	
SP1	8"	PM	6-8Ω	155313-000	8A6PA	
SP2	3½"	PM	10Ω	155372-000	3A15TZ10.6	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Stromberg-Carlson PART No.	REPLACEMENT DATA	
K1	Tone Comp.	50mmf, 100mmf, 2500mmf, 2500mmf, 100K, 100K		Centralab Sprague	PC-325 TC-5

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	Stromberg-Carlson PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	171000-126	81-T				

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	Stromberg-Carlson PART No.	JENSEN PART No.	WALCO PART No.	
M2				

MISCELLANEOUS

ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
	Switch	171000-033	On-Off, Record Changer
	Jack	152060-000	External Speaker
	Motor	171000-039	Phono

CABINETS & CABINET PARTS

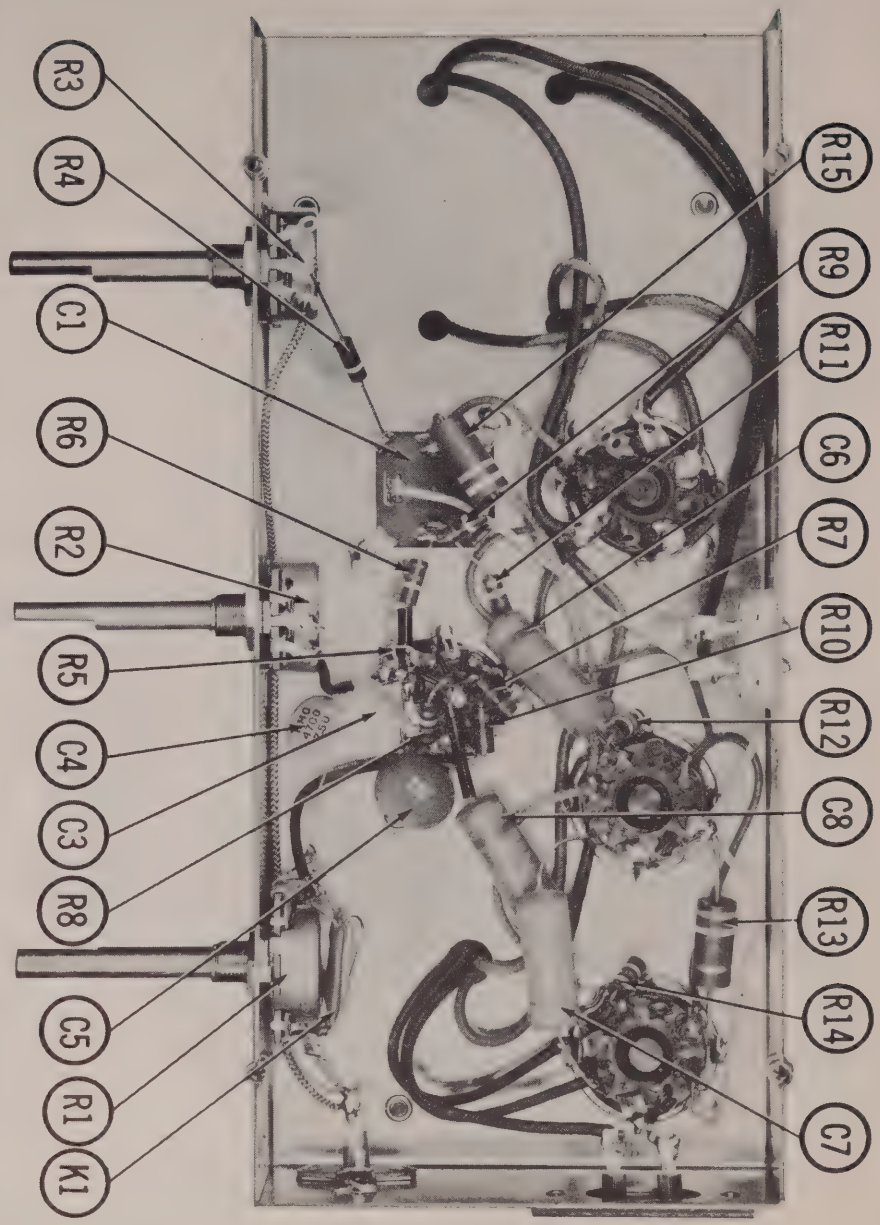
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

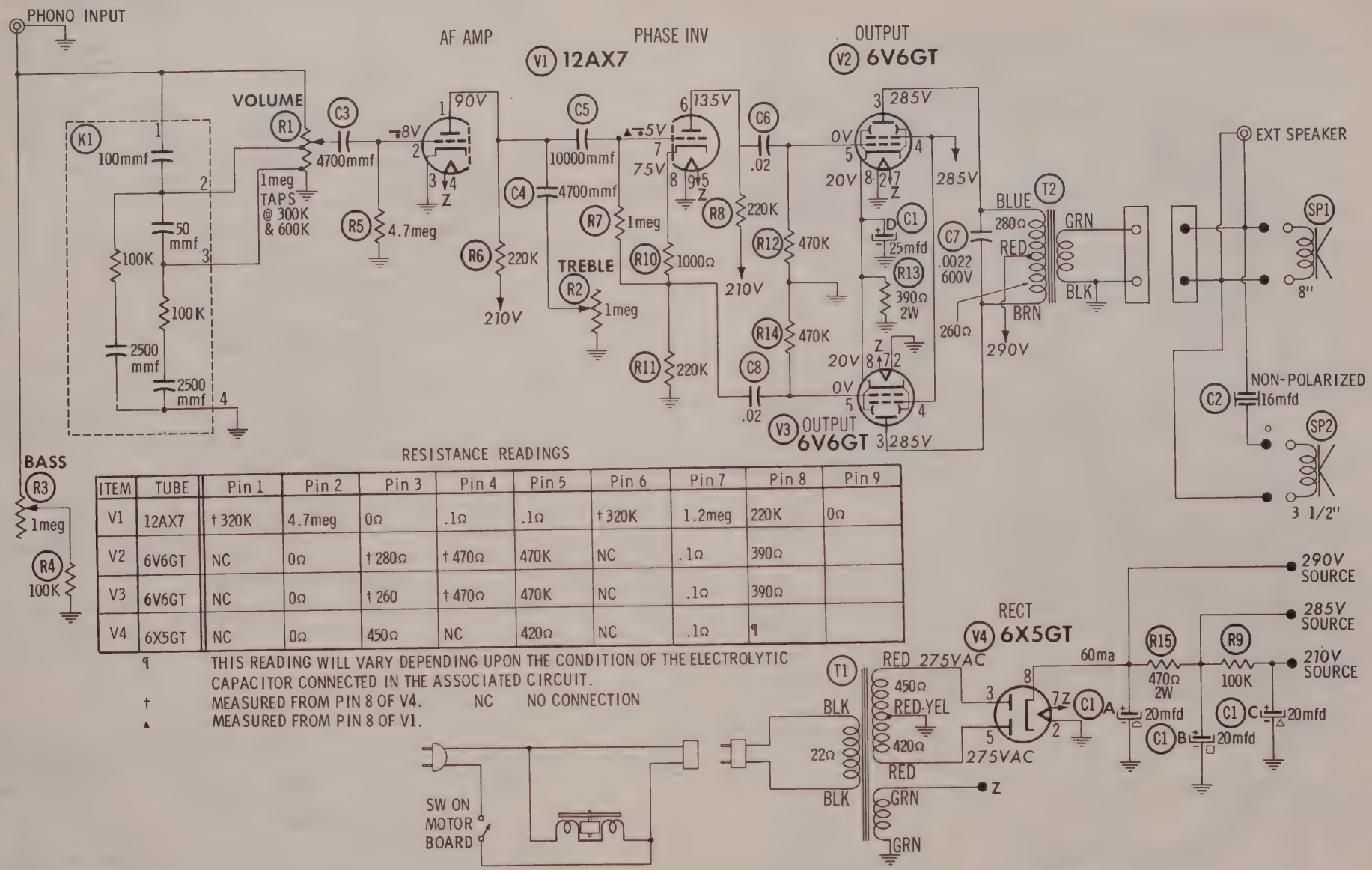
NAME	PART NO	DESCRIPTION
Knob	134315-000	Clear, 3 used
Knob	171000-138	Control, Black, Model PF-530
Knob	171000-139	Control, Brown, Model PF-535
Cabinet Ass'y.	108000-044	Model PF-530
Cabinet Ass'y.	108000-045	Model PF-535

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW





ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†320K	4.7meg	0Ω	.1Ω	.1Ω	†320K	1.2meg	220K	0Ω
V2	6V6GT	NC	0Ω	†280Ω	†470Ω	470K	NC	.1Ω	390Ω	
V3	6V6GT	NC	0Ω	†260	†470Ω	470K	NC	.1Ω	390Ω	
V4	6X5GT	NC	0Ω	450Ω	NC	420Ω	NC	.1Ω	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM PIN 8 OF V4. NC NO CONNECTION

▲ MEASURED FROM PIN 8 OF V1.

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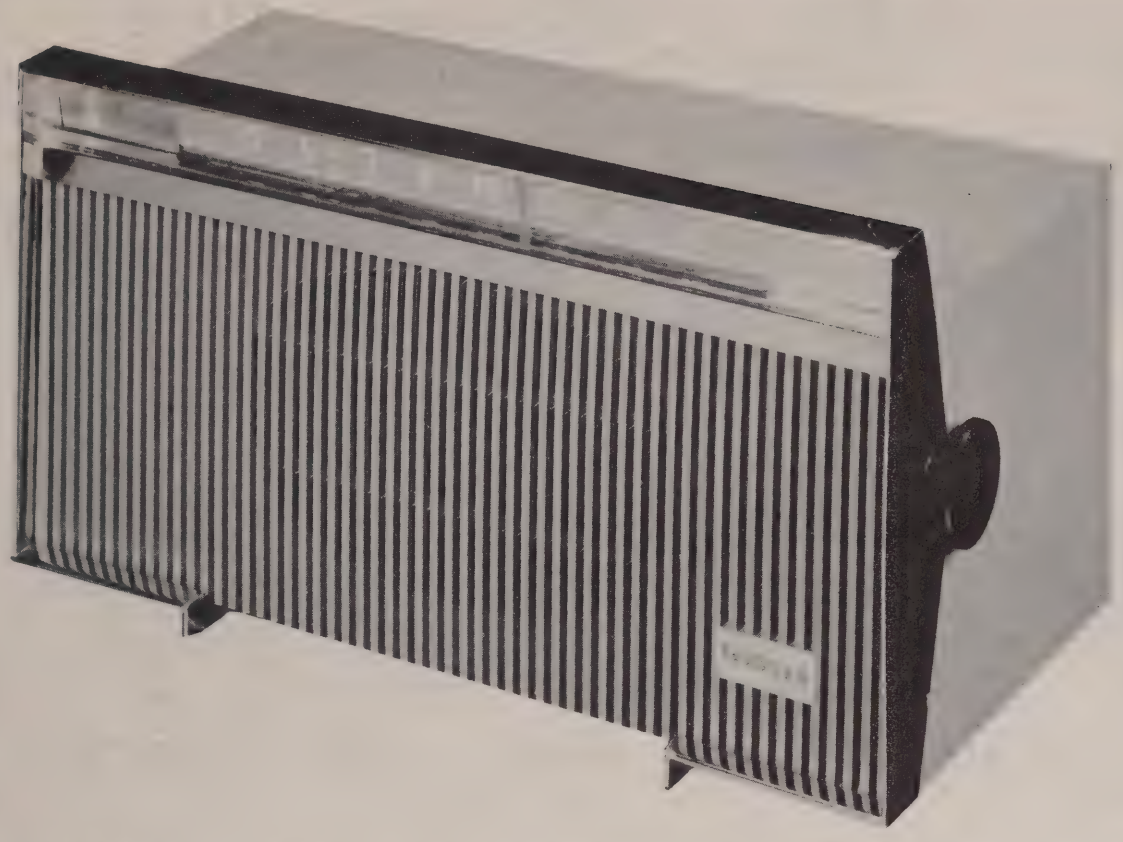
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

TRAV-LER MODELS
T-210, T-211, T-212, T-213

TRAV-LER MODELS
T-210, T-211, T-212, T-213



TRADE NAME	Trav-Ler Models T-210, T-211, T-212, T-213
MANUFACTURER	Trav-Ler Radio & Tel. Corp., 571 W. Jackson Blvd., Chicago, Illinois
TYPE SET	AC-DC Operated AM Receiver
TUBES(Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
RATING	.41 Amp. @117 Volts AC (42 Watts)
TUNING RANGE—BROADCAST	540-1620 KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to Pin 7 (Grid) of 12BE6(V1). Low side to B-	455KC (400~ Mod)	Tuning Gang Fully Open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	600KC	600KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang. Repeat Steps 2 & 3.
4.		"	1400KC	Tune to 1400KC Signal	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H690

SET 423 FOLDER 22

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Trav-Ler PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	70	150		PRS150V8040	BBRD8415	TCD498	TDLD-11	MTD-303	TVA-2462
B	40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Trav-Ler PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	220			SI220	D6-221	LT6T22	UC-5322	5GA-T22	①
C3	.05	400		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C4	47			N750-DI47	DTN-47	C10Q47U	NT-5447	5TCU-Q47	N750 10%①
C5	.022	400							10%
C6	.05	400		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C7	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	

① Not used in some versions

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Trav-Ler PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K		VC-103	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Trav-Ler PART No.	NOTES
R2	1meg			Note 1
R3	22K			
R4	47Ω			Note 1
R5	3.3meg			

ITEM No.	RATING OHMS	RATING WATT	Trav-Ler PART No.	NOTES
R6	220Ω			Note 2
R7	150Ω			
R8	1000Ω	1		
R9	720Ω	20		

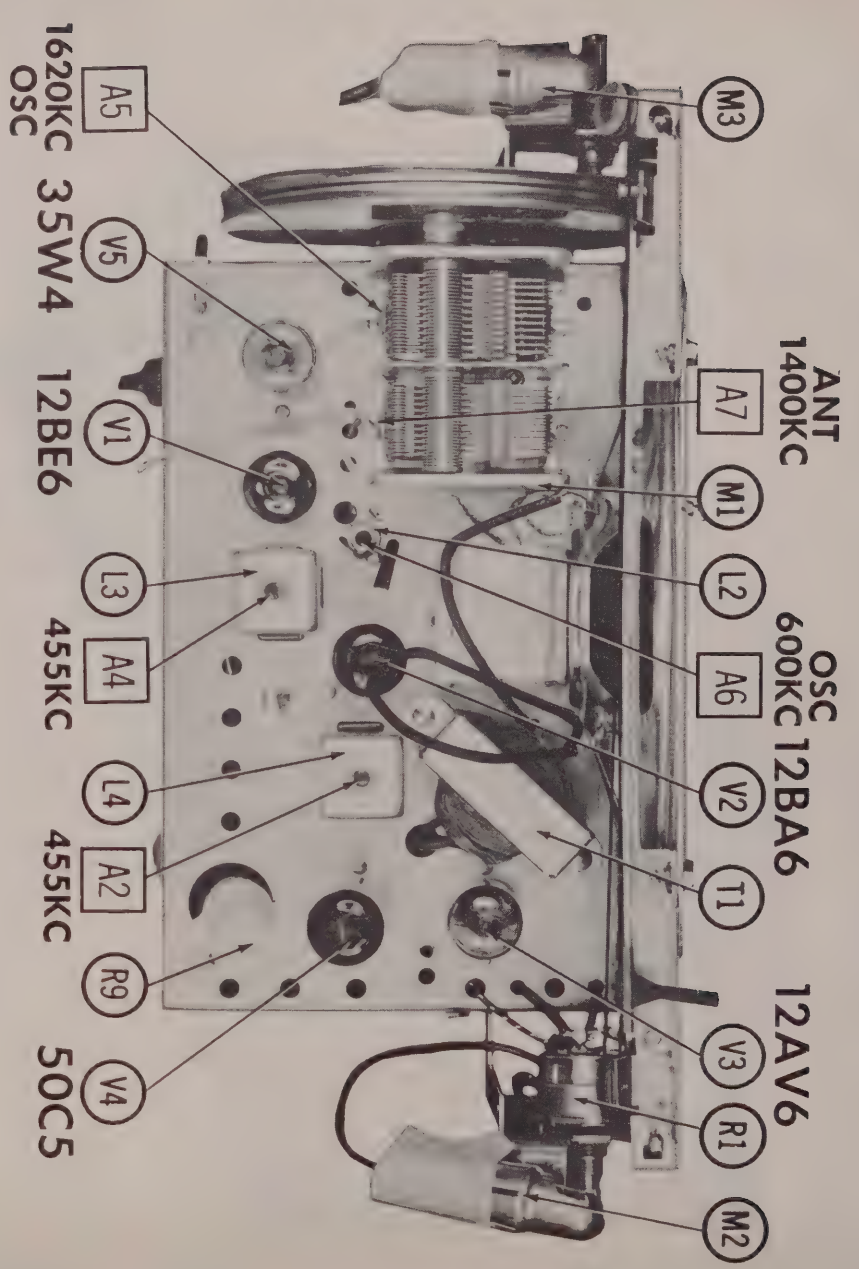
Note 1. Not used in some versions
Note 2. Some versions may use 150Ω in this application

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA Trav-Ler PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Stick						
L2	Osc. Coil		14-1077	BC-393*	69-OSC*		
L3	Input IF	LI-19	16-6758	BC-352	12-C1	RF-1	
L4	Output IF	LI-19	16-6758	BC-353	12-C2	RF-2	

* Disregard capacity winding

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Trav-Ler PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2200Ω Tap @13Ω	3-4Ω	AT-24	Z1102	A-3031		A-3336	24S50A	S-16X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Trav-Ler PART No.	QUAM PART No.	
SP1	4" x 6"	PM	3-4Ω	SPK-59	46A1	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Trav-Ler PART No.	REPLACEMENT DATA
K1	Audio Couplate	220mmf, 250mmf, 250mmf, 2000mmf, 5000mmf, 470K, 470K, 6.8meg.		Aerovax PA-113-1 Centralab PC-150 Cornell-Dubilier 116TM1 Sprague DT-1

MISCELLANEOUS

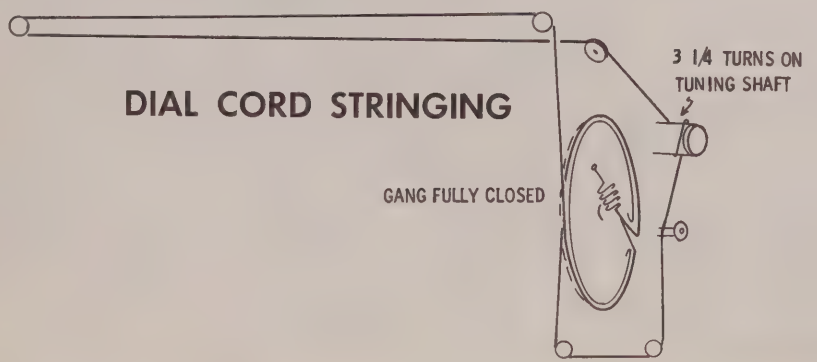
ITEM No.	PART NAME	Trav-Ler PART No.	NOTES
M1	Tuning Cap.		Two Gang (Ant. 32-402mmf, Osc. 27-176mmf)
M2	Lamp		#47
M3	Lamp		#47

WIRING DATA

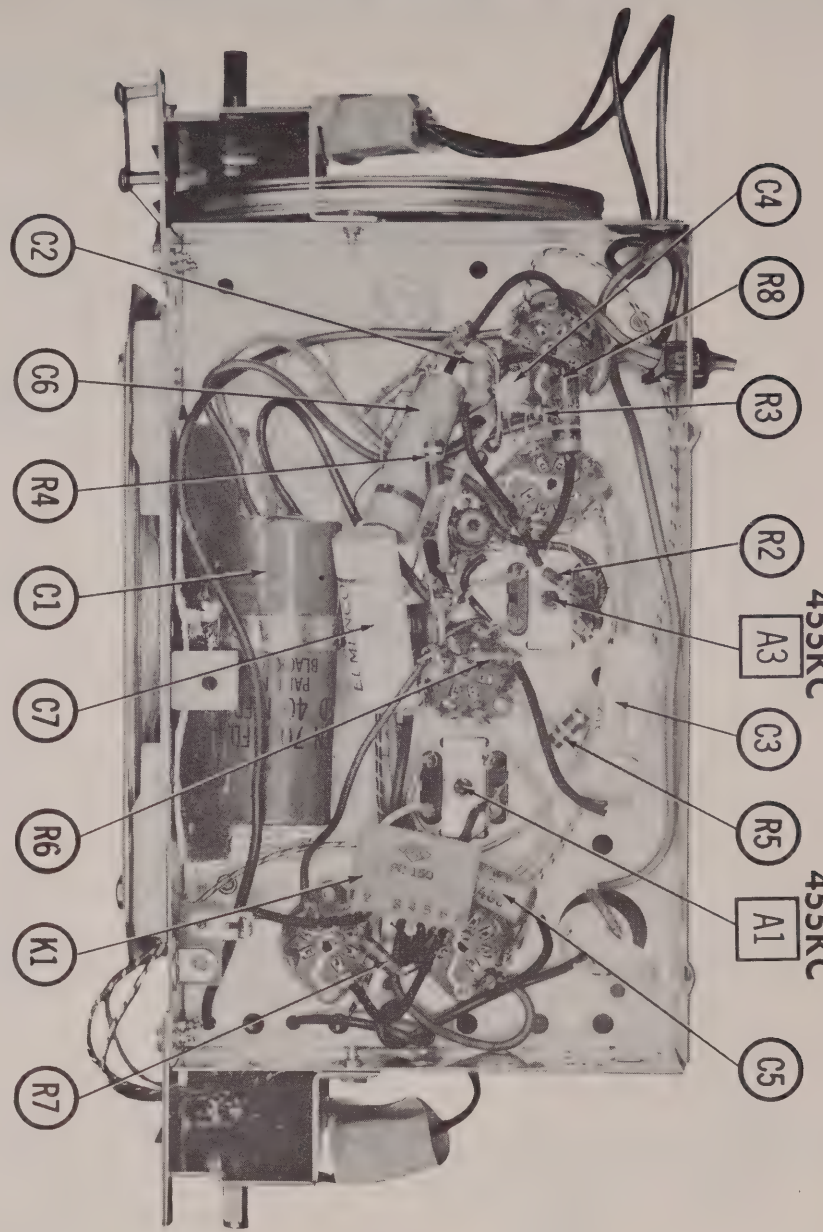
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

DIAL CORD STRINGING

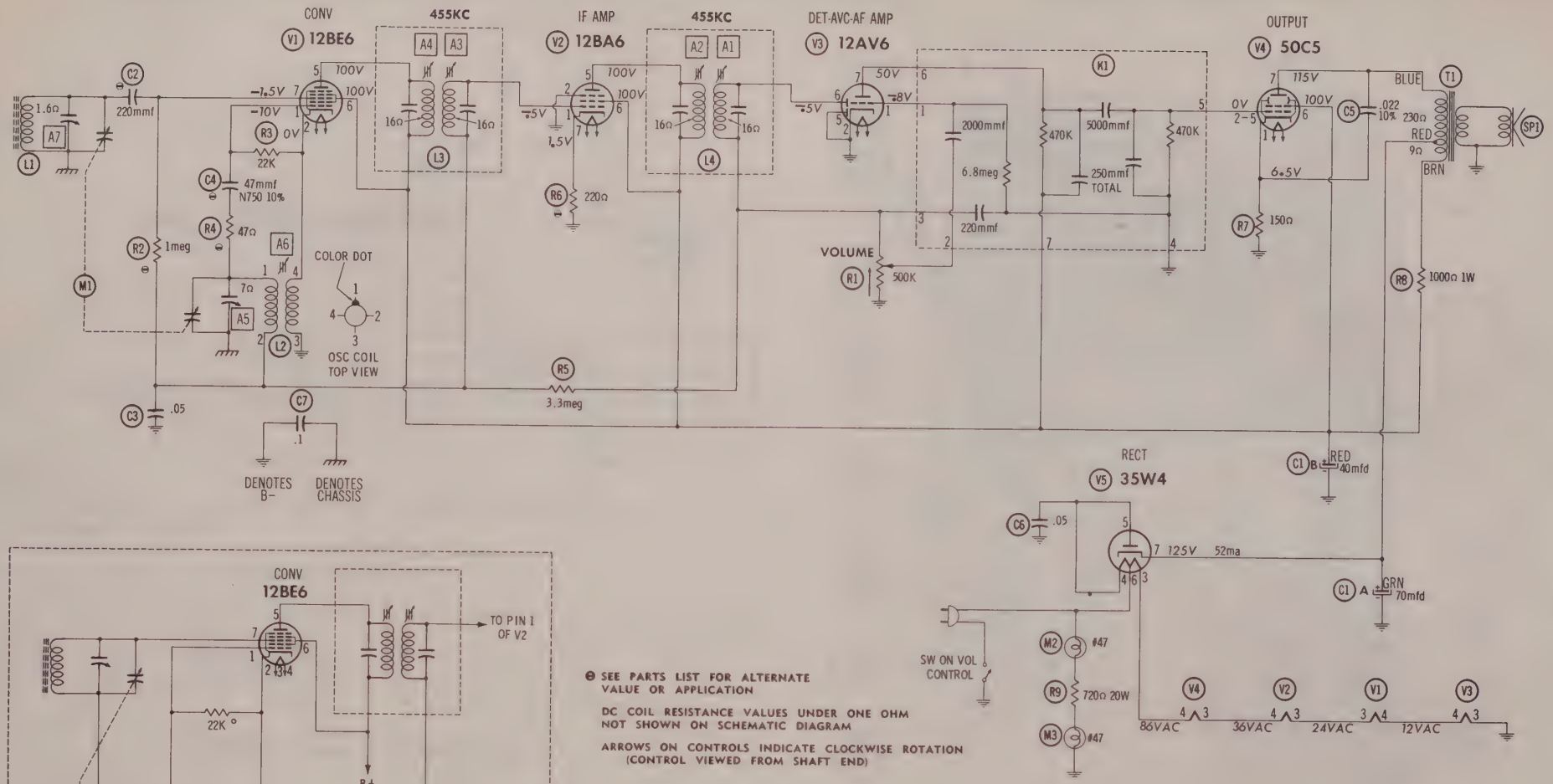


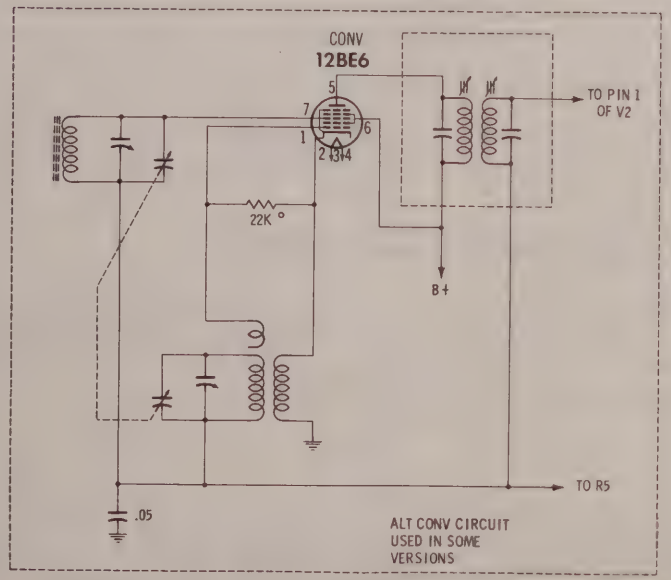
CHASSIS—BOTTOM VIEW



TRAV-LER MODELS
T-210, T-211, T-212, T-213

FOLDER 22





❷ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	5Ω	24Ω	12Ω	†1000Ω	†1000Ω	4.8meg
V2	12BA6	3.8meg	0Ω	24Ω	36Ω	†1000Ω	†1000Ω	220Ω
V3	12AV6	6.8meg	0Ω	0Ω	12Ω	0Ω	500K	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	†1000Ω	†230Ω
V5	35W4	TP	TP	86Ω	115Ω	115Ω	108Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 7 OF V5
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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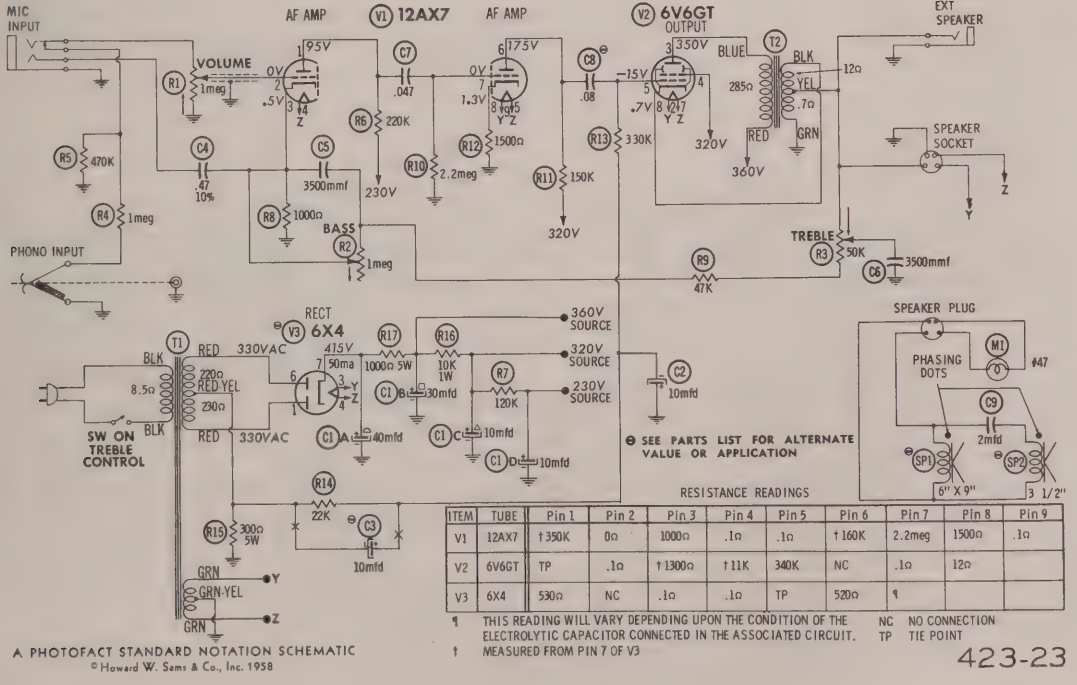
PHOTOFACT* Folder

TRADE NAME	V-M Models 165, 166, 166A, 8809, 8810
MANUFACTURER	V-M Corp., Benton Harbor, Michigan
TYPE SET	AC Operated Phono Amplifier
TUBES(Three)	Types 12AX7 AF Amplifier, 6V6GT Output, 6X4/ EZ90 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .44 Amp. @ 117 Volts AC (43 Watts)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†350K	0Ω	1000Ω	.1Ω	.1Ω	†160K	2.2meg	1500Ω	.1Ω
V2	6V6GT	TP	.1Ω	†1300Ω	†11K	340K	NC	.1Ω	12Ω	
V3	6X4	530Ω	NC	.1Ω	.1Ω	TP	520Ω	¶		

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 7 OF V3
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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423-23

V-M MODELS
165, 166, 166A, 8809, 8810

SET 423 FOLDER 23

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H727

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AX7	
V2	Output	6V6GT	
V3	Rectifier	6X4/ EZ90	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA V-M PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	450	12045	AFH4-18-10	D0171	FP446	TMQ-18 TD-10-450	Q-060 MT-4510	TVL-4771.8
B	■30	450							
C	▲10	450							
D	10	450							
C2	10	25	12046	PRS25V10	BBR10-25	TC22	TD-10-25	MT-0210	TVA-1204
C3	10	25	12046 ①	PRS25V10	BBR10-25	TC22	TD-10-25	MT-0210	TVA-1204

① Not used in some versions

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA V-M PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.47	200	12038				GEM-2047		10%
C5	3500		12041						
C6	3500		12041						
C7	.047	400	12009	P488N-047		CUB4S47	GEM-4147	4TM-S47	
C8	.08	400							①
C9	2.0	100	12069						

① Some versions may use .1mfd 400V in this application (Part #12008)

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA V-M PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	12319	B-70	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	1meg	½	12319	B-70	A47-1meg-Z	Q13-137	U53	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	50K	½	12318	B-31	A47-50K-S	Q11-123	U35	Treble
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	Power On-Off

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls

RESISTORS

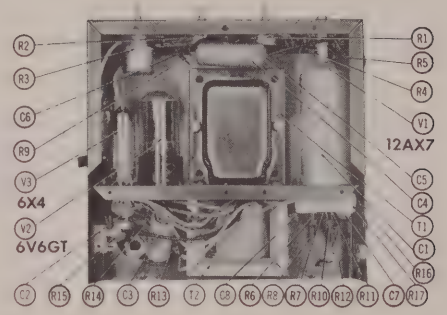
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	V-M PART No.	NOTES
R4	1meg		11453	
R5	470K		11373	
R6	220K		11293-10	
R7	120K		11233-10	
R8	1000Ω			
R9	47K		11133-10	
R10	2.2meg		11533	
R11	150K		11253-10	
R12	1500Ω			
R13	330K		11333	
R14	22K		11053	
R15	300Ω	5	11948	
R16	10K	1	10974	
R17	1000Ω	5	12330	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA V-M PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .44A	710VCT ⓐ .050A	6.3VCT ⓐ 1.42A	12540						

CHASSIS—BOTTOM VIEW



TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA V-M PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5800Ω	34Ω Tapⓐ 8Ω	12541	Z1011①	A-2905	AU-609①	A-3849①	24S64①	S-53X①	① Drill New Mounting Hole

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA V-M PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	6"X9"	PM	6-8Ω	8958①	69A3Z8	① Used in Model: 166A
	8"	PM	3-4Ω	9797③	8A31PAZ3.7	② Used in Model: 166
	6"X9"	PM		8606②		③ Used in Model: 165
SP2	3½"	PM	14-16Ω	8959①	3A15T	
	8"	PM	3-4Ω	9798③	8A31PAZ3.7	
	3½"	PM	14-16Ω	8440②	3A15T	
	3½"	PM	14-16Ω	9799③	3A15T	

MISCELLANEOUS

ITEM No.	PART NAME	V-M PART No.	NOTES
M1	Lamp	8648	Includes Speaker Cable Assembly, Models 166, A

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	15679-A	3 Used, Model 166A
Knob	8826	3 Used, Model 166
Knob	14611-A46	Bass, Model 165
Knob	14613-A46	On-Off-Treble, Model 165
Knob	5605-A46	Volume, Model 165
Case	15539-A	Complete, Includes Hardware, Model 166A
Case	8818-A	Complete, Includes Hardware, Model 166
Cabinet	14610	Model 165
Handle	8073-C	Model 166A
Handle	8073-B	Model 166

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

ZENITH MODEL
A555L (Ch. 5A08)

ZENITH MODEL
A555L (Ch. 5A08)

ZENITH MODEL
A555L (Ch. 5A08)

TRADE NAME	Zenith Model A555L (Ch. 5A08)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	AC Operated AM Receiver With 4 Speed Automatic Record Changer
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110 - 120 Volts AC - 60 Cycles
RATING	.28 Amp. @ 117 Volts AC (25 Watts Less Motor)
TUNING RANGE—BROADCAST	535 - 1620KC

FOR SERVICE INFORMATION ON RECORD CHANGER S-14072 - SEE SIMILAR ZENITH S-14078 - PHOTOFACT SET 392 FOLDER 14

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 12BE6 (V1). Low side to chassis.	455KC (400∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 2 and 3.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H603

SET 423 FOLDER 24

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amp.	12AV6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲80	150	22-2394	AFH4-01	D0010	FP311.7	TMQ-1	Q-005	TVL-4441
B	■40	150							
C	▲20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	200	22-2792	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C3	100		22-5	BPD-0001	DD-101	L10T1	UC-531	5GA-T1	
C4	3300		22-11	BPD-0033	DD-332	BYA10D33	UC-5333	5GA-D33	
C5	10000		22-3	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C6	10000		22-3	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C7	10000		22-3	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C8	.047	200	22-2792	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C9	10000		22-3	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C10	4700		22-4	BPD-0047	DD-472	BYA10D47M	UC-5247	5HK-D47	
C11	.1	200	22-2783				GEM-201		10%
C12	10000		22-3	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C13	.01	400	22-2811	P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C14	470	1000	22-6	HVD-15-470	DD-471	BYA10T47	DC30347	5GA-T47	
C15	10000		22-3	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C16	.047	200	22-2792	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C17	.047	200	22-2792	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	63-4059	B-59	A47-500K-S	Q11-133	U50	Loudness
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	Power On-Off
R2A	500K	½	63-4080 ①	B-59	A47-500K-S	Q11-133	U50	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

① Some versions may use Part #63-4060 in this application.
* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

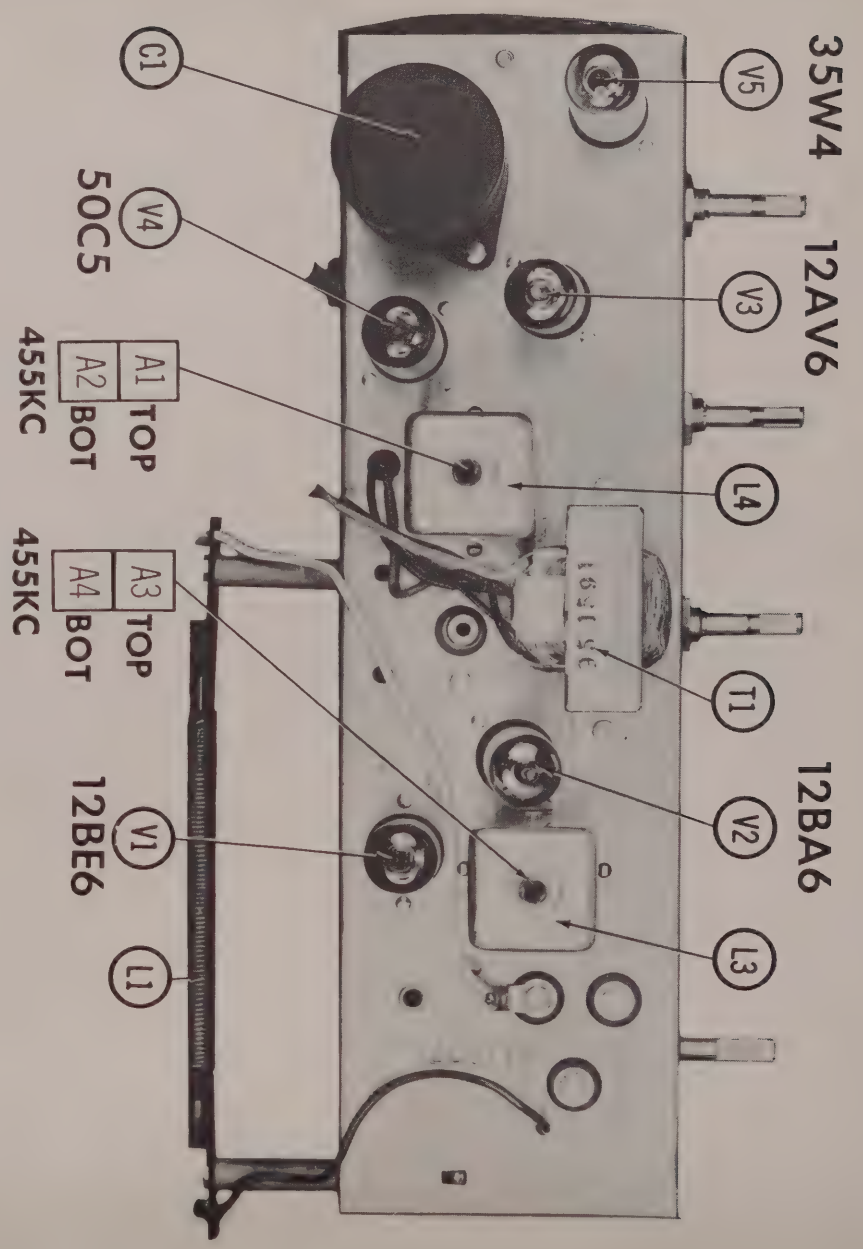
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ZENITH PART No.	NOTES
	OHMS	WATT		
R3	15meg		63-1961	
R4	10K		63-1828	
R5	330K		63-1891	
R6	4.7meg		63-1940	
R7	10K		63-1828	
R8	120Ω		63-1747	
R9	180K		63-1880	
R10	2.2meg		63-1926	
R11	4.7meg		63-1940	

ITEM No.	RATING		ZENITH PART No.	NOTES
	OHMS	WATT		
R12	470K		63-1898	
R13	470K		63-1898	
R14	150Ω	1	63-1977	
R15	3300Ω		63-1807	
R16	820Ω		63-1782	
R17	1500Ω		63-1793	
R18	1000Ω	1	63-965	
R19	22Ω	1	63-3197	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		ZENITH PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Stick	S-24659					
L2	Osc. Coil	S-43104	14-1077 ▲	BC-393▲*	69-OSC▲*		
L3	Input IF	95-1101	16-6666	BC-368	012-C1	RF-1 ♦	
L4	Output IF	95-1102	16-6770 ♦	BC-355 ♦	12-C6 ♦		

* Disregard capacity winding. ▲ Drill new mounting hole. ♦ Use adapter plate.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2500Ω Tap @ 6%	3-4Ω	95-1591	Z1103 ①	A-3031 ①		A-3336 ①	24S50A ①	S-16X ①	① Drill new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	QUAM PART No.	
SP1	5 1/4"	PM	3-4Ω	49-841	52A1	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	ZENITH PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	142-80	81-TB				

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	ZENITH PART No.	JENSEN PART No.	WALCO PART No.	
M2				

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Lamp	100-189	#1891
M4	Tuning Cap.	22-3043	2 Gang (Ant. 26-363mmf, Osc. 16-120mmf)
M5	Switch	85-601	Radio-Phono, Rotary Wafer Type
	Jack	44-25	Phono Input

CABINETS & CABINET PARTS

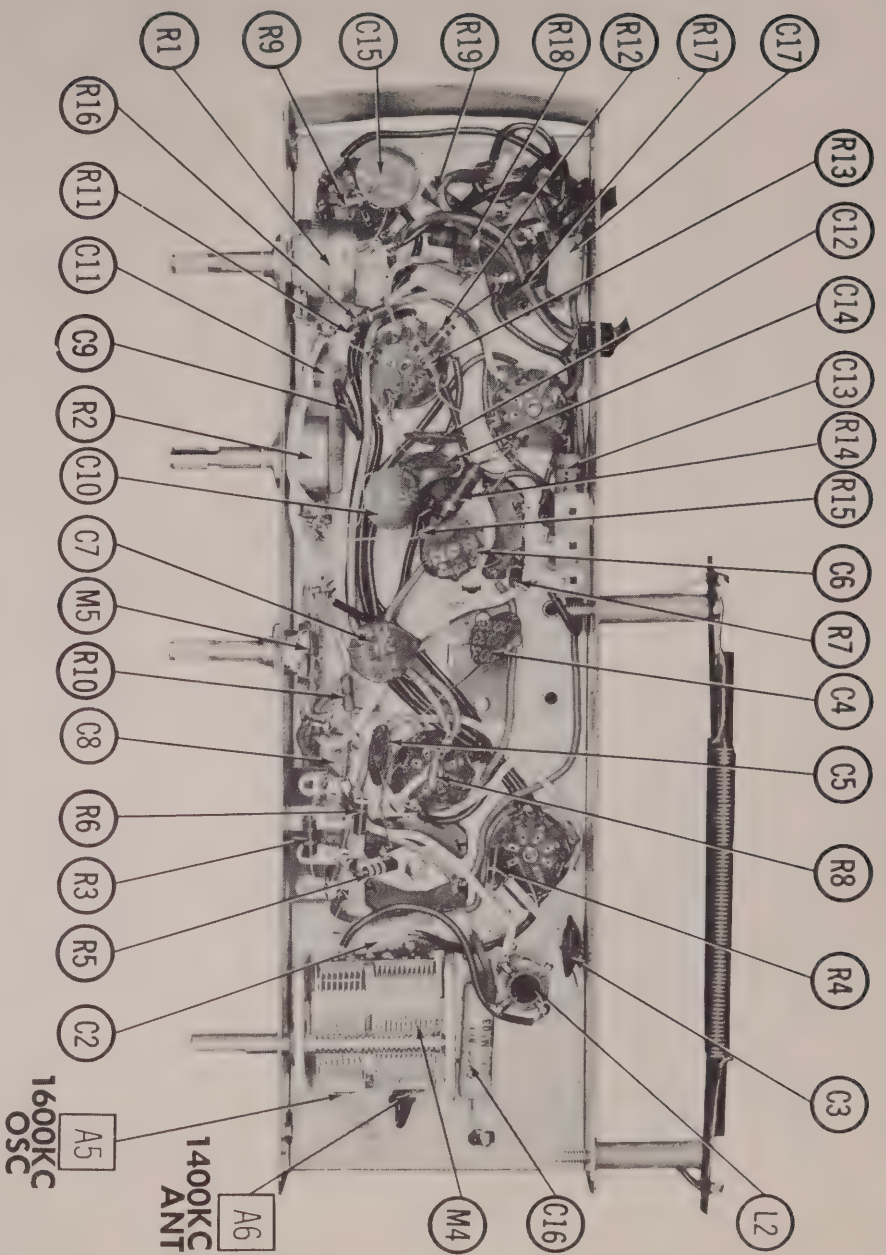
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

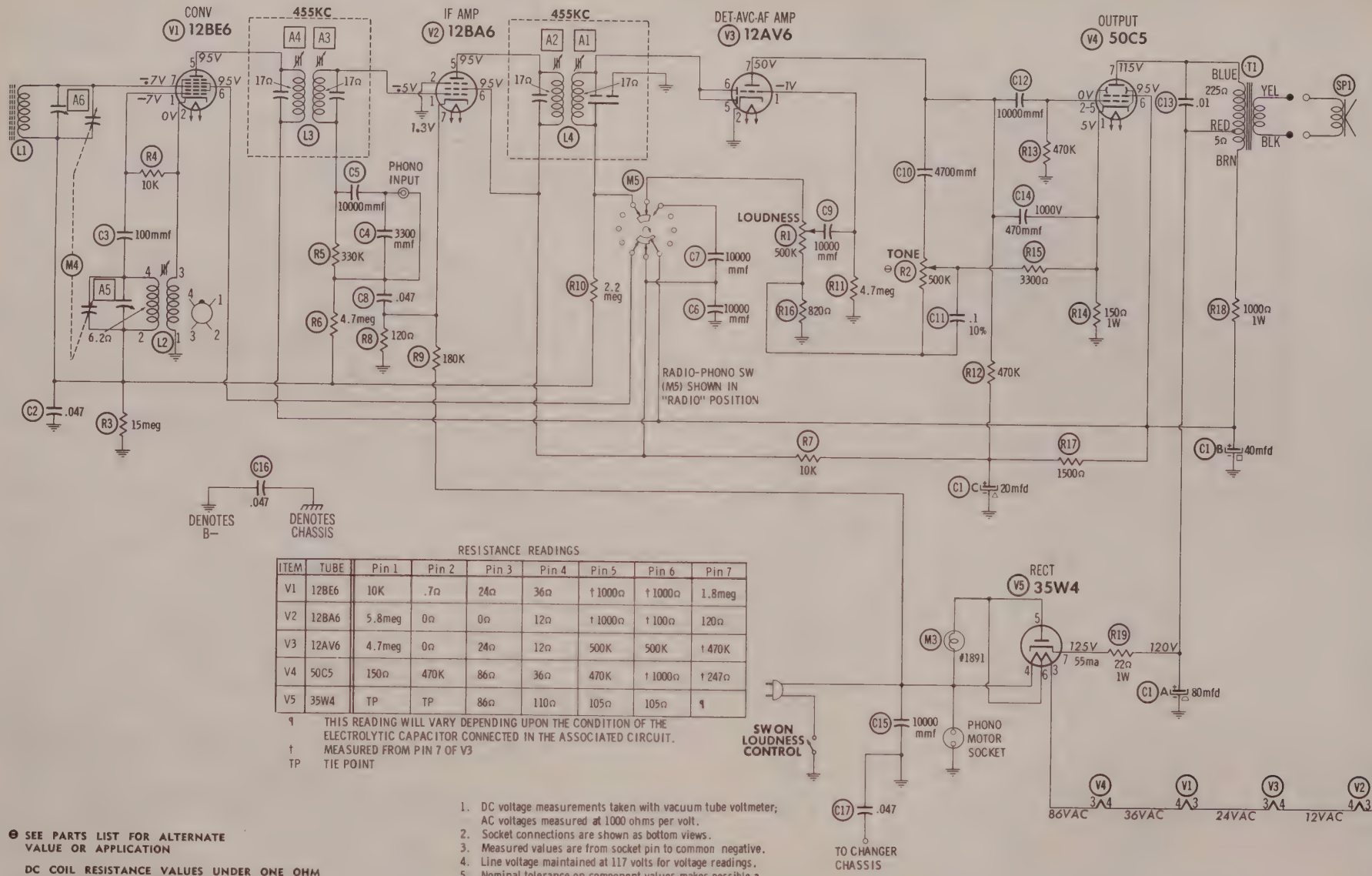
NAME	PART NO.	DESCRIPTION
Knob	46-1782	Tuning
Knob	46-1357	Radio-Phono, Tone, On-Off-Volume
Cabinet	14-2358L	
Adapter	S-24231	45RPM

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	10K	.7Ω	24Ω	36Ω	†1000Ω	†1000Ω	1.8meg
V2	12BA6	5.8meg	0Ω	0Ω	12Ω	†1000Ω	†100Ω	120Ω
V3	12AV6	4.7meg	0Ω	24Ω	12Ω	500K	500K	†470K
V4	50C5	150Ω	470K	86Ω	36Ω	470K	†1000Ω	†247Ω
V5	35W4	TP	TP	86Ω	110Ω	105Ω	105Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 7 OF V3
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

❸ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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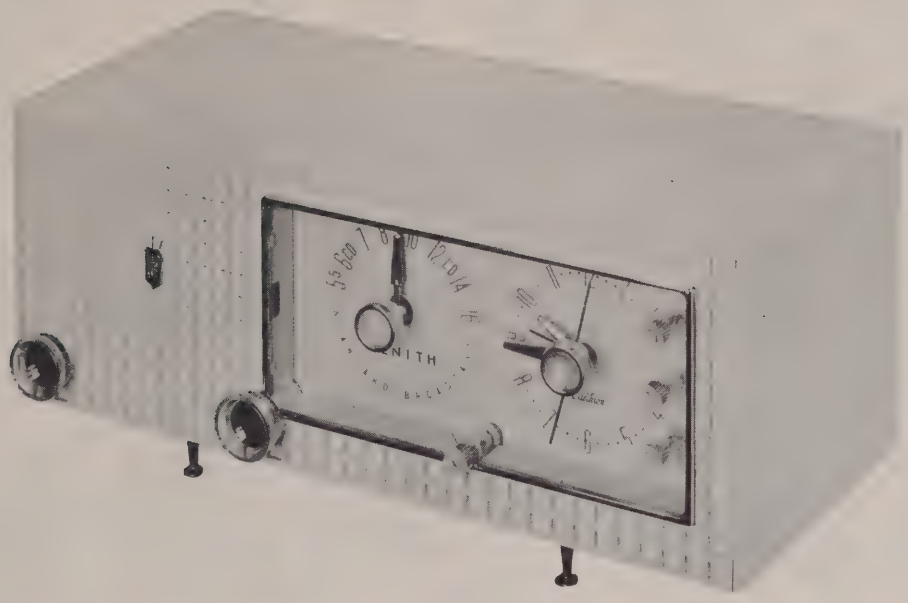
PHOTOFACT* Folder
*TRADE MARK

ZENITH MODELS
A624G, A624Y, A624W (Ch. 6A03)

ZENITH MODELS
A624G, A624Y, A624W (Ch. 6A03)



TRADE NAME	Zenith Models A624G, A624Y, A624W (Ch. 6A03)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	AC Operated AM Receiver With Electric Clock
TUBES (Six)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 35C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .27 Amp. @ 117 Volts AC (26 Watts Less Clock)
TUNING RANGE—BROADCAST	535-1620KC

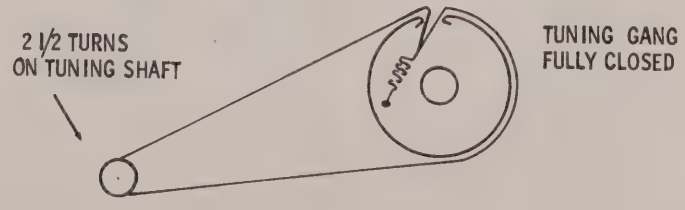
ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screw-driver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.5mfd	High side to Pin 7 (grid) of 12BE6 (V2). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output.
2.		Loop	1600KC	1600KC	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A4, A5	"
4.		"	600KC	Tune to 600KC signal	"	A6	Repeat steps 2 and 3.

DIAL CORD STRINGING



ZENITH MODELS
A624G, A624Y, A624W (Ch. 6A03)

SET 423 FOLDER 25

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H665

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12BA6	
V4	Det. -AVC-AF Amp.	12AV6	
V5	Output	35C5	
V6	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Zenith PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■80	150	22-2351	AFH2-19	XB0181	FP216	TMD-16	D-085	R1534 *
B	▲40	150							

* Non-Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Zenith PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.047	200	22-2792	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C3	.047	200	22-2792	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C4	10000	1000	22-3	DAC-27	DD-103	BYA10S1		5HK-S1	
C5	470	1000	22-6	HVD-15-470	DD-471	L10T47	DC30347	5GA-T47	
C6	10000	1000	22-3	DAC-27	DD-103	BYA10S1		5HK-S1	
C7	10000	1000	22-3	DAC-27	DD-103	BYA10S1		5HK-S1	
C8	10000	1000	22-3	DAC-27	DD-103	BYA10S1		5HK-S1	
C9	.047	200	22-2792	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Zenith PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	63-3661	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2	7Ω	1(WW)	63-3659					Dimmer

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

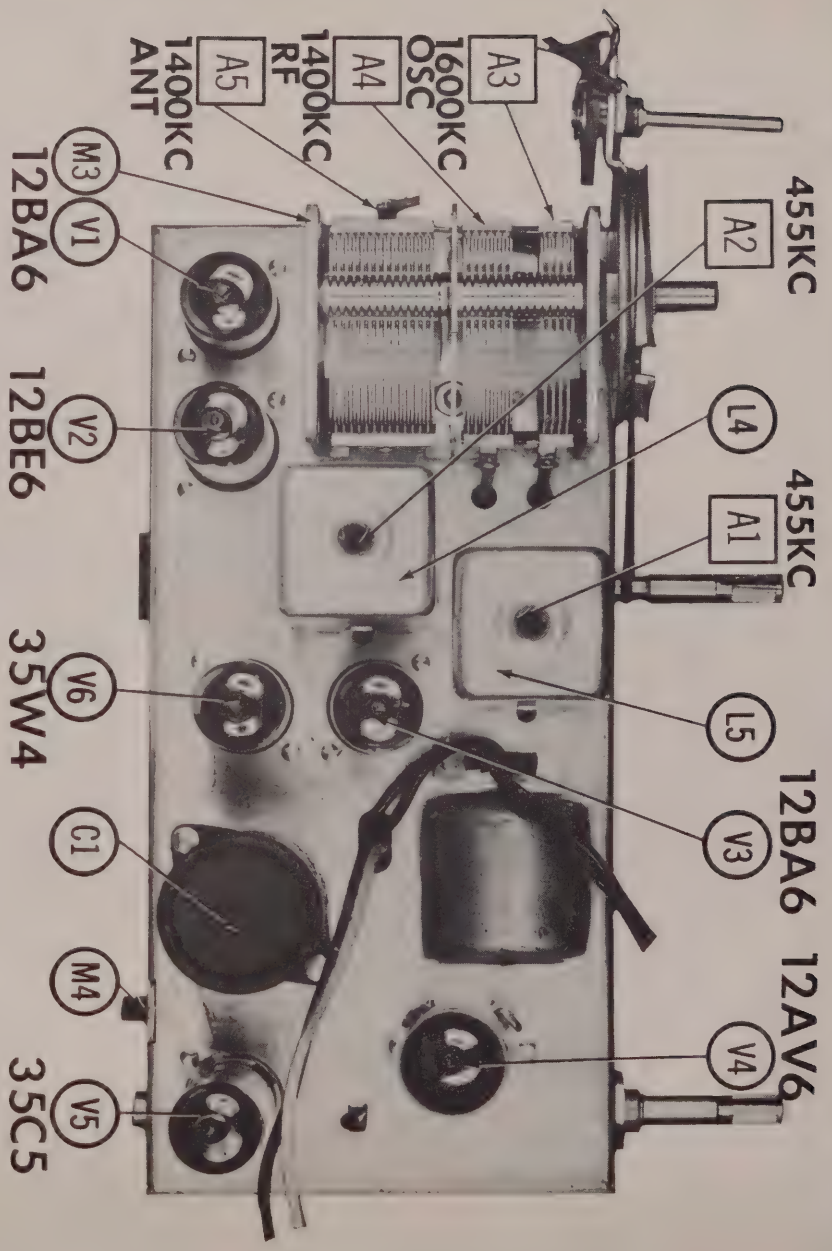
ITEM No.	RATING OHMS	RATING WATT	Zenith PART No.	NOTES
R3	15K		63-1835	
R4	330Ω		63-1765	
R5	22K		63-1842	
R6	1000Ω		63-1786	
R7	68Ω		63-1737	
R8	47K		63-1856	
R9	2.2meg		63-1926	
R10	4.7meg		63-1940	
R11	470K		63-1898	
R12	470K		63-1898	
R13	150Ω		63-1750	
R14	1000Ω	1	63-965	
R15	18Ω		63-1712	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA Zenith PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Ant.	S-24554					
L2	RF Trans.	S-22851					
L3	Osc. Coil	S-22852					
L4	Input IF	95-1101	16-6666	BC-368	012-C1	RF-1 ▲	
L5	Output IF	95-1102	16-6770 ▲	BC-355 ▲	12-C6 ▲		

▲ Use adapter plate

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Zenith PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2750Ω Tap @ 100Ω (3%)	3-4Ω	95-1568							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Zenith PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	49-713	4A07	

MISCELLANEOUS

ITEM No.	PART NAME	Zenith PART No.	NOTES
M1	Dial Lamp	100-36	#44
M2	Pilot Lamp	100-51	#43
M3	Tuning Cap.	22-2879	3 Gang (Ant. 32-465mmf, RF 16-212mmf, Osc. 11-85mmf)
M4	Switch	85-495	DPDT Slide Switch (Radio-Phono)
M5	Clock Assy.	S-24553	Includes On-Off Switch

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

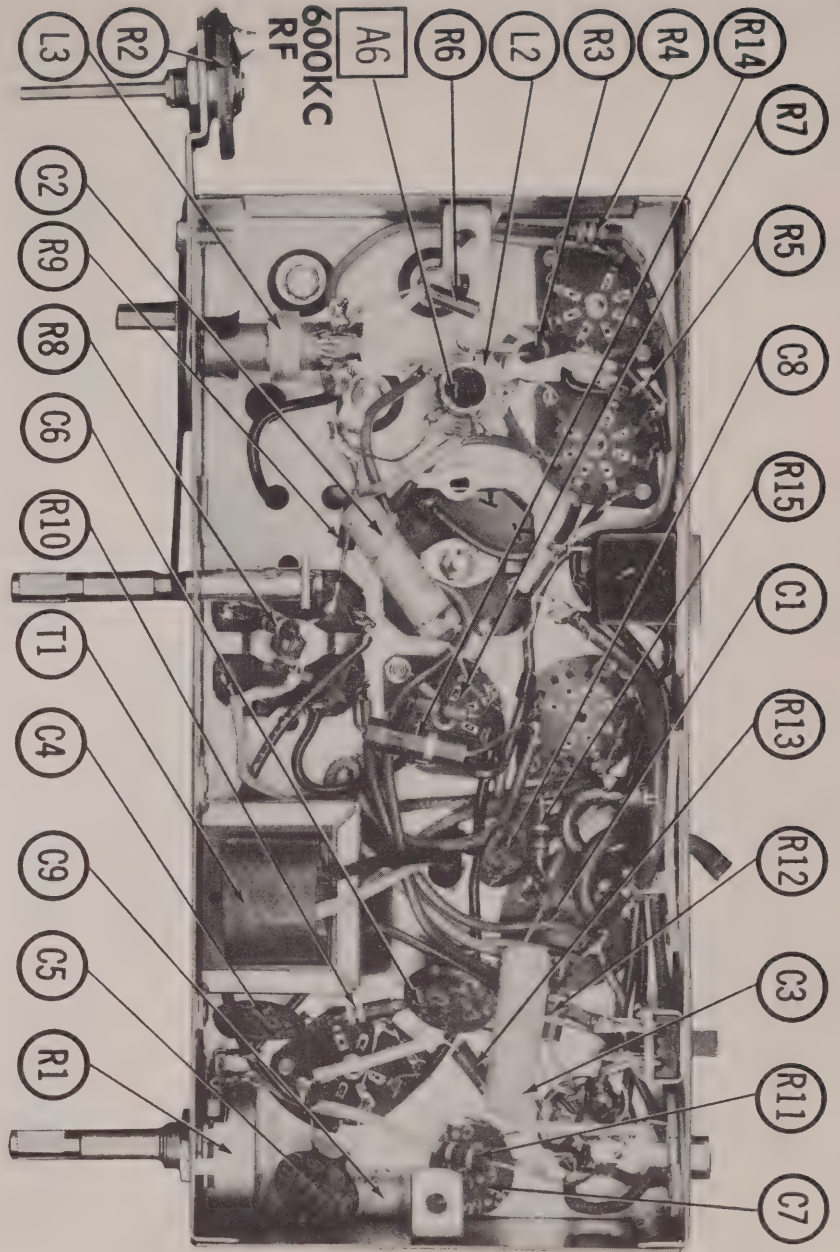
NAME	PART NO.	DESCRIPTION
Bezel	7-21	
Knob	46-1562	Volume, Tuning
Knob	46-1561	Alarm, Radio, Auto-Off, and Dimmer
Cabinet	S-40245	Cabinet and Grille, Model A624W
Cabinet	S-40224	Cabinet and Grille, Model A624G
Cabinet	S-40574	Cabinet and Grille, Model A624Y
Legs	96-91	Two Used
Dial Pointer	59-319	
Dial Scale	57-2274	Background
Dial Crystal	192-224	

WIRING DATA

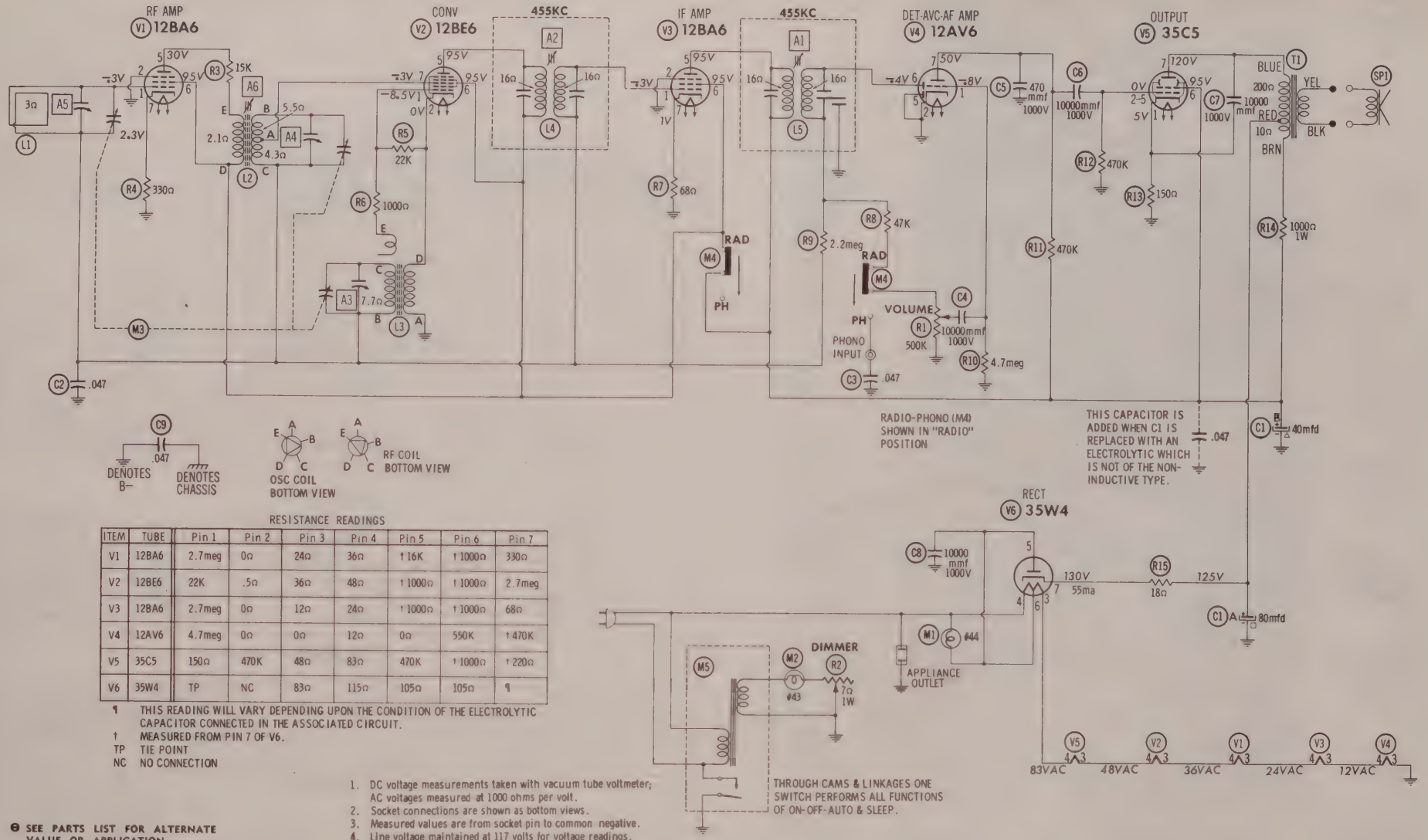
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW



FOLDER 25
ZENITH CH. 6A03



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BA6	2.7meg	0Ω	24Ω	36Ω	†16K	†1000Ω	330Ω
V2	12BE6	22K	.5Ω	36Ω	48Ω	†1000Ω	†1000Ω	2.7meg
V3	12BA6	2.7meg	0Ω	12Ω	24Ω	†1000Ω	†1000Ω	68Ω
V4	12AV6	4.7meg	0Ω	0Ω	12Ω	0Ω	550K	†470K
V5	35C5	150Ω	470K	48Ω	83Ω	470K	†1000Ω	†220Ω
V6	35W4	TP	NC	83Ω	115Ω	105Ω	105Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 7 OF V6.
TP TIE POINT
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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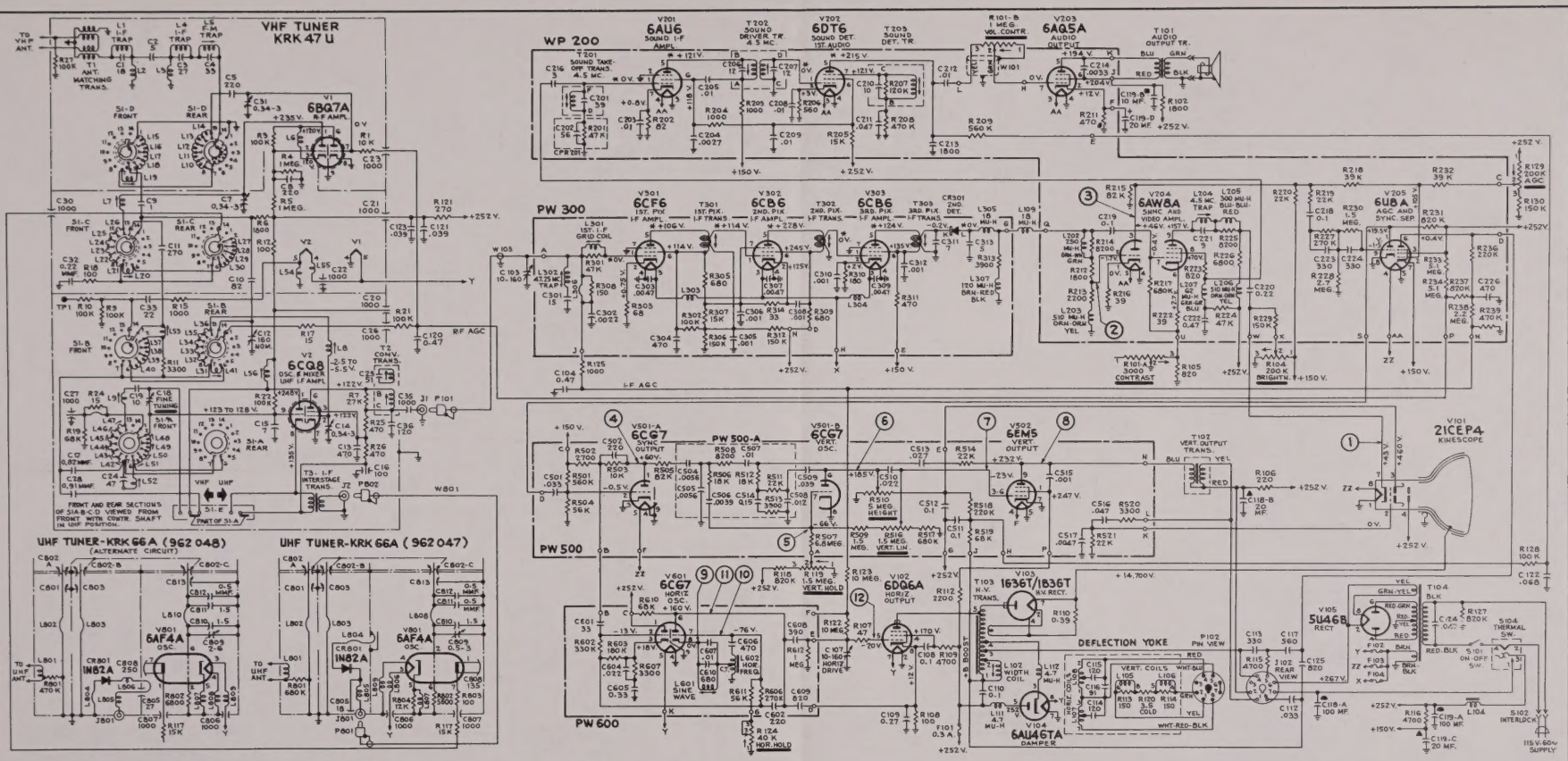
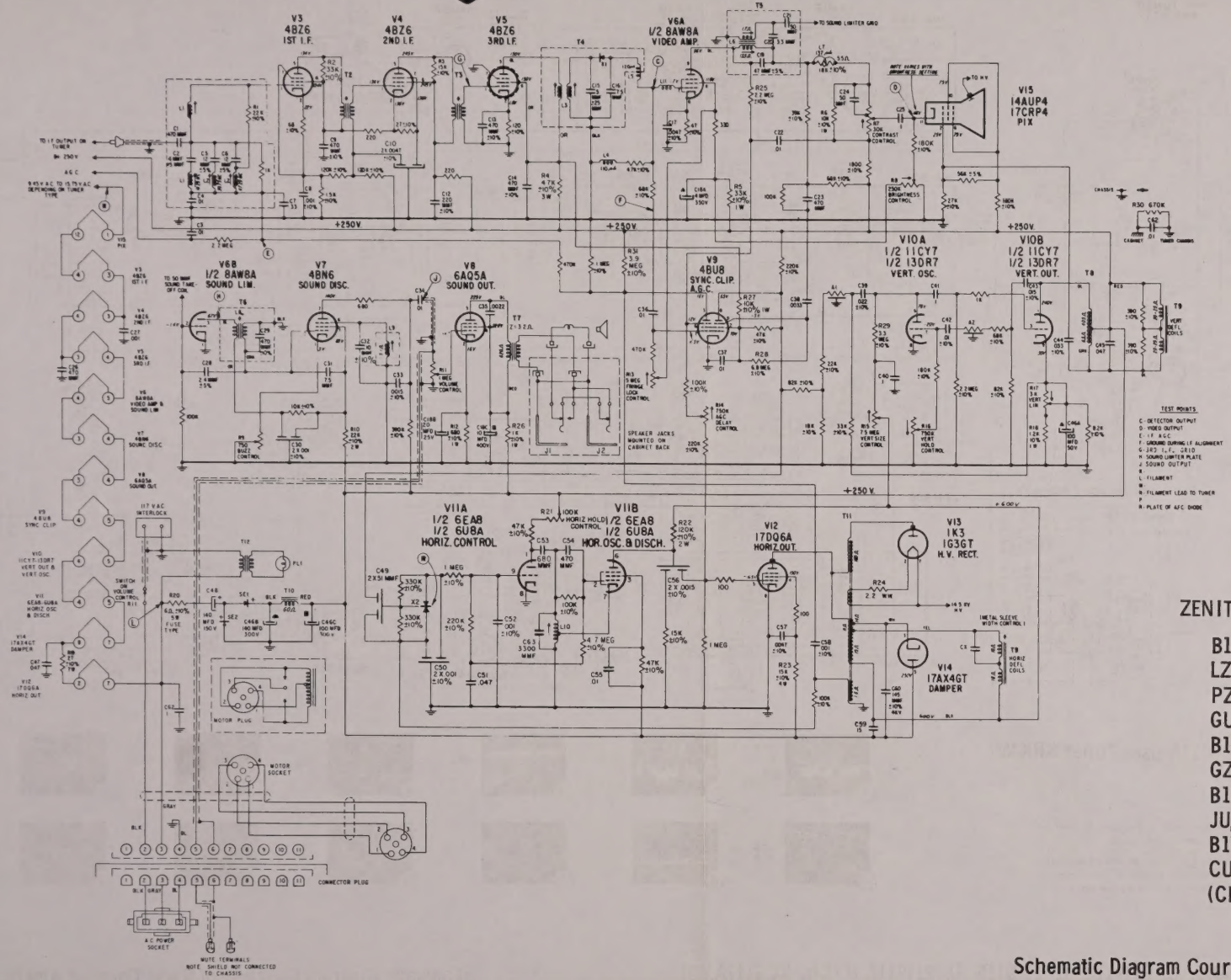


*Measured with 1 megohm, ½ watt resistor in series with probe.

Balloons (1) (2) etc., shown on schematic above, indicate points of observation of the waveforms shown at the right.

RCA VICTOR MODELS 21PT9095, U, 21T9112, U, 21T9115, U, 21T9117, U (Ch. KCS117A, B)

Schematic Diagram Courtesy of Radio Corp. of America


V3 4BZ6 1ST I.F.
V4 4BZ6 2ND I.F.
V5 4BZ6 3RD I.F.
V6A 1/2 8AW8A VIDEO AMP.
V15 14AUP4 17CRP4 PIX
V6B 1/2 8AW8A SOUND LIM.
V7 4BN6 SOUND DISC.
V8 6AQ5A SOUND OUT.
V9 4BU8 SYNC. CLIP. A.G.C.
V10A 1/2 11CY7 1/2 13DR7 VERT. OSC.
V10B 1/2 11CY7 1/2 13DR7 VERT. OUT.
V11A 1/2 6EA8 1/2 6U8A HORIZ. CONTROL
V11B 1/2 6EA8 1/2 6U8A HOR. OSC. & DISCH.
V12 17DQ6A HORIZ. OUT.
V13 1K3 1G3GT H.V. RECT.
V14 17AX4GT DAMPER
+250V
TEST POINTS
SPEAKER JACKS MOUNTED ON CABINET BACK
MOTOR PLUG
MOTOR SOCKET
CONNECTOR PLUG
A.C. POWER SOCKET
MUTE TERMINALS NOTE: SHELL NOT CONNECTED TO CHASSIS

ZENITH MODELS

B1410L, LU, LUD, LZ, LZU, LZUD, B1411P, PU, PUD, PZ, PZU, PZUD, B1412G, GU, GUD, GZ, GZU, GZUD, B1413G, GU, GUD, GZ, GZU, GZUD, B1715L, LU, LUD, B1716C, CU, CUD, B1717J, JU, JUD, B1718B, BU, BUD, B1719P, PU, PUD, B1720C, CU, CUD, B2001L (Chassis 15B20, Q, U, UD)

Schematic Diagram Courtesy of Zenith Radio Corp.

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